Promoting public benefit energy-efficiency investment in new power contexts in South Africa

ALIX CLARK
JUSTICE MAVHUNGU

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ENERGY & DEVELOPMENT RESEARCH CENTRE
University of Cape Town

CONTENTS

1. Introduction

When power industries around the world have been restructured (generally involving the introduction of competition into the industry), investment in demand-side management (DSM) has declined considerably. The South African electricity industry now lies on the brink of considerable restructuring and, following international trends, it appears likely that local DSM programmes and plans will also be threatened. Foreseeing this, the Energy and Development Research Centre began, in mid-1999, to undertake research, analysis and advocacy work on 'The implications of power sector restructuring on investment in demand side management in South Africa'. The key objective of this project was to find, and then recommend, ways of protecting DSM in changing power sector contexts. This would be done through investigating how other countries have sought to protect investment in energy efficiency, understanding better the potential implications of power sector reform for investment in energy efficiency, alerting policy makers and programme implementers to any dangers, and working with these stakeholders to develop reasonable policies, programmes and plans to support energy-efficiency investment in changing contexts.

This research project has comprised various different outputs and activities. Firstly, we undertook a review and analysis of the impact that power sector restructuring has had on investments in DSM in selected countries around the world (namely, United States, New Zealand, England and Wales, Norway, Chile and Argentina, Brazil, Thailand, and Ghana). This review also investigated how these different countries have (or have not) supported investment in public benefit energy efficiency as more competition has been introduced into power industries. Secondly, we investigated barriers inhibiting investment in DSM in South Africa. We undertook this analysis from the perspectives of utilities' residential, commercial and industrial customers, Eskom, municipal distributors, and government. Thereafter, we undertook a scenario analysis to get a sense of what might happen to DSM investment as the power industry in South Africa was reformed. We looked at DSM investment in the context of the structure and ownership patterns of (i) the current structure of the power industry; (ii) when the electricity distribution industry (EDI) has been rationalised into a small number of regional electricity distributors (REDs), (iii) when competition has been introduced into the wholesale electricity market; and (iv) when retail competition is in effect. This report comprises the fourth, and last, research output for this project. It makes recommendations to the government, the National Electricity Regulator (NER), Eskom, and municipal distributors on how to ensure that public benefit energy-efficiency investment is well placed in new power sector contexts in South Africa.

To get to the point of being able to make these recommendations, we have undertaken various activities. Firstly, as noted, we investigated the barriers inhibiting investment in energy efficiency in South Africa. Secondly, we looked at what might happen to these barriers as more competition was progressively introduced into the power industry in South Africa. We noted that some of these barriers could be reduced or removed by power sector restructuring, while others could not. We also noted that reform would bring about new market barriers.[1] We chose to focus on the barriers that could be addressed, or would be introduced, by power sector restructuring. This is not to say that we do not see barriers that would be largely unaffected by power sector restructuring as being unimportant. Indeed, many of these barriers (for example, customer unwillingness to adopt new and efficient technologies or inability to afford these technologies and changed behaviours, poor economic conditions, scarcity of specialised skills to implement DSM programmes, etc) are the most concerning of all. The objective of our work, however, is to develop an 'in-depth understanding of the impacts power sector restructuring could have on investment in DSM, and then to make recommendations to ensure that this investment not only continues to occur, but also grows in magnitude'.

Thirdly, we held a workshop to disseminate results of our research, to receive comment on it, and to initiate broader industry debate in this area, inviting a wide range of electricity industry policymakers and stakeholders including those from the NER, Department of Minerals and Energy (DME) and other government departments, local distributors, Eskom, government departments, research organisations, electricity intensive users group and local government associations.

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[1] See Clark & Barberton (1999).

Fourthly, we have spent time – in some instances, extensive time – with staff of Eskom, DME and the NER discussing policies, programmes and activities to remove, or at least reduce, these barriers. For the most, we presented preliminary recommendations and asked for responses from these institutions. We noted these responses, and altered, refined or added to the recommendations where relevant. Finally, we drafted this report. We will take this report to the stakeholders who contributed to it, as well as to others. In doing so, we would hope to continue to provide momentum and substance to the debate on whether and/or how public benefit energy-efficiency investment should be protected as the distribution industry is rationalised, and as more competition is introduced into South Africa's power sector.

The recommendations presented in this document vary in nature. We have sought to suggest policy positions or roles government, the NER, Eskom and municipal distributors might assume with regard to energy efficiency. We also make recommendations on appropriate governance and institutional arrangements, as well as operational and financing mechanisms that would protect this public benefit. These recommendations are made where appropriate: it seems, for example, more relevant to focus suggestions on amended organisational structure for the DME vis-à-vis energy efficiency than on financing arrangements. Likewise, in presenting recommendations to the NER, it seems relevant to place emphasis on financing mechanisms for energy-efficiency investment rather than on altering the internal organisational structure of the NER.

2. A 'public benefit' energy-efficiency investment focus

In undertaking an international review of the impact that power sector restructuring has had on investment in DSM, as well as the measures that some countries have adopted to ensure the survival of this type of investment, it became clear early on in the research that, for the purposes of making sound recommendations, it is necessary to differentiate between the various types of DSM. These types of DSM can be grouped into two different categories: DSM investments that are in the utilities' financial interests to undertake and those which are not. Generally, load management initiatives such as *load-shifting*, *interruptibility*, *strategic growth*, and a relatively small amount of *energy-efficiency* investments fit well within the former category – i.e. DSM investments that contribute positively to the bottom-line of the utility. 'Other' energy-efficiency investments fall within the second category.

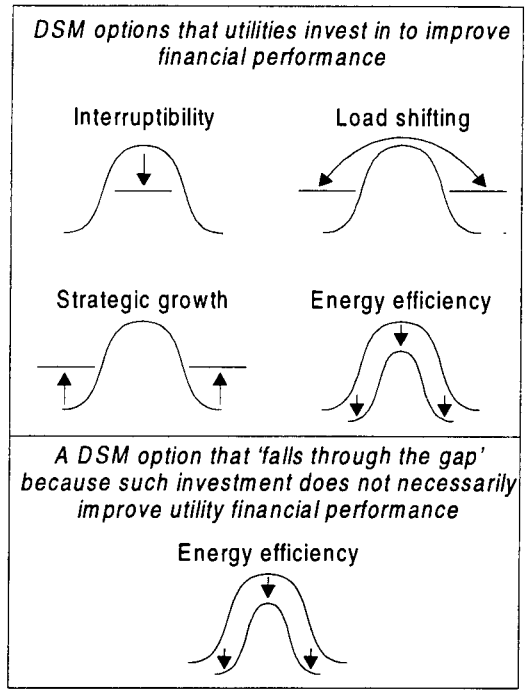

Figure 1: DSM options

Targeted generally at large and sometimes small industrial and commercial users of power (and sometimes residential customers), the first category of load-management-type DSM initiatives generally attract investment funds when such investments contribute to the bottom-line of the utility and/or help to improve utilities' service to customers. The benefit to the utility is generally derived from the fact that the need for new capacity and/or network investments is deferred. Customers benefit from favourable tariff packages, reduced energy bills and direct interface with the utility. This win-win situation therefore motivates utilities to remove, or at least reduce, the barriers inhibiting customer participation in these types of DSM programmes.

Our international review has indicated that *DSM initiatives in the first category have not been as affected by restructuring processes as have the second category of energy efficiency type DSM programmes.* Programmes in this second category involve training and education activities, information and awareness campaigns, demonstrations and audits, and direct installation programmes targeted mainly at small industrial and commercial customers as well as at the residential sector. These types of investments involve a more complex investment decision for utilities. In general, as competitive pressures have been introduced into countries' electricity sectors, investment in this type of DSM has declined significantly. Reluctance to allocate resources to this type of energy-efficiency programme has occurred because restructuring generally seeks to harness competitive forces to improve the economic efficiency of the system. Achieving this goal makes it more difficult for players in the industry to invest in these types of energy-efficiency programmes *and* remain price-competitive (Swisher 1994).

Here, one of the biggest barriers to the implementation of this type of energy-efficiency investment is the barrier existing within the utility itself. Because energy efficiency implies a decrease in a utility's total kWh sales, it is not in a utility's best interest to develop programmes in this area (unless, as noted, it pays a utility to do so). This disincentive exists before and after restructuring. It is particularly prevalent subsequent to restructuring because of competitive pressures). Prior to restructuring, utilities are generally more prepared to invest in energy-efficiency programmes because of (a) the institutional links between generation, transmission and distribution; and (b) a natural monopoly status that enables or encourages some degree of public benefit social investment.

To summarise, when developing an understanding of the prospects for DSM investment in changing markets in order to propose mechanisms to protect this investment, it is important to define precisely what type of investment is being proposed for promotion and protection. The remainder of this report focuses on the second category of energy-efficiency investment which, as noted, targets smaller industrial and commercial customers, as well as residential households. In essence, this type of investment is that which easily 'falls between the gaps', particularly so when broader industry restructuring initiatives are introduced, or even just proposed. Furthermore, this report focuses on investments traditionally made by utilities, and those which utilities in changing markets, and energy service companies (or ESCOs), cannot easily justify taking responsibility for. Hereafter, this type of investment will be referred to as 'public benefit energy-efficiency investment.'

3. Rationale for promoting public benefit energy-efficiency investment

Many government departments, regulatory authorities and distributor utilities around the world have undertaken, in one way or another, to invest in public benefit energy-efficiency programmes. Recently, we undertook a review of this, and noted the following rationale for these initiatives.

- *Governments and regulators have sought to protect the interests of power sector customers.* Governments and regulators in, for example, England and Wales, Norway, New Zealand, United States and South Africa have created conditions that enable household and business customers to make the best investment decisions around energy usage, and thus to reduce costs associated with such energy usage. Regulators are frequently required to carry out this responsibility, albeit in conflict with other regulatory responsibilities, most notably keeping energy prices low.
- *Governments and regulators are committed to achieving energy-environmental policy goals.* With perhaps the exception of Argentina and Chile, most of the countries reviewed under this study have promoted energy-efficiency investment because such investment is seen to contribute substantially towards national sustainable development goals.

- *Governments are committed to reducing greenhouse gas emissions.* Governments committed under the Rio Declaration (1992) to substantial reductions in greenhouse gas emissions have sought to promote energy-efficiency investment. As examples: The Office of the Electricity Regulator (formerly Offer and now Ofgas) in the United Kingdom retained the services of the Energy Savings Trust – which was initially established as a means of meeting the UK's obligations under the Rio Declaration – to promote energy-efficiency investment. The primary objective of New Zealand's Energy Efficiency and Conservation Authority is to 'achieve governmental energy and environmental policy goals, particularly with respect to CO_2 emission reductions'. One of the two primary objectives of South Africa's Efficient Lighting Initiative is to contribute towards a reduction in greenhouse gas emissions.
- *With growing capacity constraints, governments and utilities encourage energy-efficiency programmes that will contribute towards reducing the need for new power sector investments.* In most of the developing countries that this review studied, energy-efficiency programmes have been seen as a means towards managing power sector capacity constraints. The government of Brazil, for example, established PROCEL to fund or co-fund conservation projects carried out by state and local utilities, universities, state agencies, private companies and research institutes. In South Africa, Eskom funds various DSM programmes, the main objective of which is to defer the decision to invest in new capacity. Similarly, peak savings are the objective of energy-efficiency programmes in Thailand and Ghana.
- *Investment in energy efficiency is seen to make a real contribution to the economy.* In some countries reviewed, energy-efficiency investment is promoted because of a wide acceptance that it makes a *real* financial/economic contribution. That energy-efficiency investment results in win-win situations for customers and implementors is undisputed, and well-known. In such instances, energy-efficiency investment is often undertaken as a component of an integrated resource planning (IRP) framework (in particular, Norway and the United States). Here, regulators require planning based on principles of IRP planning to ensure that the best, most robust investment decisions are made.
- *Utilities invest in energy-efficiency programmes because they contribute towards customer retention/expansion programmes as well as benefit from improved customer service.* As noted, distributor utilities become loath to invest in public purpose energy-efficiency programmes as competition is introduced into the power sector. Indeed, it is rare in these contexts for utilities to invest in this area of their own accord. When they do, however, it is mainly for other reasons, including adding value to their service to customers in order to either improve customer service or to retain and grow market base.

International energy policy literature illustrates numerous examples of how energy efficiency *is* in fact often the *least-cost* way to provide energy services, while at the same time reducing environmental impacts of energy use (for example, Lovins & Lovins 1991; Reddy & Goldemberg 1990; Gadgil & Jannuzzi 1991; Kats 1991; Krause & Eto 1988). In other words, this literature cites examples of DSM initiatives where the social and environmental cost of helping customers to utilise energy more efficiently is less than the social and environmental cost of producing more electricity. Benefits of DSM include lower energy costs for consumers and reduced need for new power plants with their attendant environmental problems.

Some analysis to assess the costs and benefits of DSM initiatives has been undertaken in South Africa too. Eskom's integrated electricity planning (IEP) team has undertaken a considerable amount of work in this area. On a far smaller scale, so too has the Energy and Development Research Centre. Indeed, in 1995, we embarked on a policy project entitled *Energy efficiency, equity and environment: improving access to energy services for the urban poor in South Africa*. Jointly funded by Eskom and the International Development Research Centre (IDRC) of Canada, the primary aim of the project was to identify policies and strategy interventions which could improve the appropriateness and efficiency of energy services in a way that addresses both the energy poverty and the energy-related environmental problems experienced by the urban poor. An element of this project was to understand the economics of these policies and strategy interventions from the point of view of customers, Eskom Generation and the distribution industry.

The first phase of this project comprised a background or scoping exercise, which aimed at gauging the international and local experience in energy efficiency, as well as the energy efficiency potential across all sectors of the South African economy. The second phase of the project aimed at determining the current energy end-use patterns in low-income urban households with a view to

establishing the energy needs of these households and to identifying potential areas of intervention. Four areas were identified for more detailed analysis and strategy development. These were fuel-switching, thermally efficient housing, energy-efficiency appliances and energy-efficient lighting. In the third phase of the project, these four areas were focused on in more detail. Barriers to investment were identified and recommendations were put forward to overcome these barriers (Simmonds & Clark 1998).

Results and recommendations of this project are summarised in *Energy efficiency for the urban poor: economics, environmental impacts and policy implications* (Spalding-Fecher *et al* 1999). The economic analysis presented in this report demonstrates the substantial economic and environmental benefits energy efficiency interventions yield for the urban poor. The five interventions presented include three energy-efficiency programmes (compact fluorescent lamps, efficient refrigerators and improved thermal efficiency of low-cost housing) and two fuel-switching programmes (from electricity and paraffin to gas for cooking).

From an economic perspective, four out of five of these programmes (all but the electricity to gas for cooking) generate substantial benefits for society. In other words, the cost to society of providing affordable energy services would be lower with the interventions than without them. The CFL and efficient refrigerator programme would also substantially reduce Eskom's cost of supplying energy services even with a substantial subsidy from Eskom for the capital costs, while the thermal efficiency programme would impose a very small incremental cost on Eskom. Given the current structure of tariffs in South Africa, however, the net income impact of the efficiency programme would be negative, because Eskom makes a margin on each kWh of electricity sold – so any reduction in kWh sales reduces net income. With a regulatory regime that would decouple sales from profits (i.e. basing profits on growth of customer base for instance) these could become profitable investments for Eskom (Spalding-Fecher *et al* 1999).

Because of their high discount rates and the higher up-front costs of efficiency, consumers may not consider it worthwhile to invest in energy efficiency without financing for the incremental capital costs. The CFL and efficient refrigeration programmes, however, would break even for consumers with almost no subsidy. The thermal efficiency and paraffin to gas switch programmes would require capital subsidies of 50% and 30%, respectively. Consumers who do not participate in these programmes would see marginal increases in their electricity bill due to slightly higher tariffs, but this is more than offset by the increased disposable income for participating customers (Spalding-Fecher *et al* 1999).

This particular project indicates clearly the social benefits associated with energy-efficiency programmes. Indeed, these interventions represent feasible ways that the energy sector can contribute to poverty alleviation, and broader developmental goals within South Africa.

4. An 'enabling environment' for energy efficiency

In this report specific recommendations to government, the NER, and the distribution industry are given on how to protect public benefit energy-efficiency investment. We have sought to make recommendations that hold true for different electricity industry contexts in South Africa, including for the industry (i) in its current form, (ii) when the distribution industry has been rationalised and REDs are in place, (iii) when there is competition in the wholesale, and (iv) retail markets. During the course of our work, we have found that it is less complicated to make robust recommendations to government than it is to the NER. Indeed, regulatory mechanisms supporting energy efficiency differ depending on the prevailing degree of competition in the power sector at any one time. No matter the structural and ownership patterns of industry, government, on the other hand, will always be tasked with creating (i) an enabling environment for energy-efficiency investment, and (ii) a prevailing culture that energy efficiency is a public good.

As described by Barberton and Clark (1999), various barriers inhibit optimal investment in DSM and energy-efficiency investment in South Africa. We have taken the position in this report that programmes, projects, policies and strategies should be designed so as to remove or, at the very least, reduce these barriers. In our environment, where people, time and other resources are scarce, interventions for development must be prioritised, and must also be reasonable. In this section we ask: 'how can an enabling environment for public benefit energy-efficiency investment best be created?'

We are of the opinion that an enabling environment for investment in energy efficiency can be created on various different levels, and by different role-players. These are illustrated in Figure 2 below, where government, the NER, Eskom and local service providers are identified as the key roleplayers.

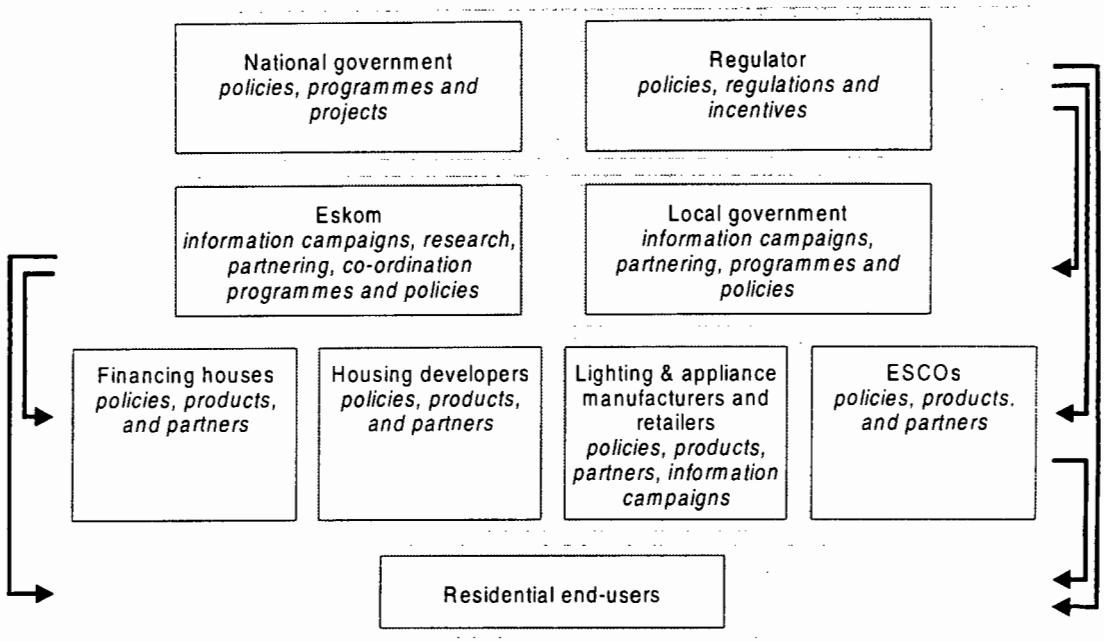

Figure 2: Creating an enabling environment for investment in energy efficiency

Through carefully designed policies, programmes and projects, government, for example, can create an environment which catalyses investment in energy-efficiency-related programmes and policies by Eskom, other local service providers, housing developers, lighting and appliance manufacturers, distributors and/or retailers, ESCOs and financing institutions. In turn, this investment should result in new or additional investment in energy efficiency, by end-users. Similarly, through an appropriate regulatory framework, the NER could either encourage or require local service providers to invest in energy efficiency projects and programmes that ultimately benefit residential customers and thus motivate for the adoption of efficient technologies.

Sections 5, 6 and 7 below recommend priority enabling activities for government, the Regulator, and the distribution industry. These roleplayers are identified as the key 'enablers', or those that have the greatest leverage to create opportunities for other players (for example, community organisations, financial institutions, housing developers, lighting and appliance manufacturers, distributors and retailers, and ESCOs) to contribute towards new investment in energy efficiency.

It should also be noted that, because of the varying nature of the prevailing barriers inhibiting investment in energy efficiency, as well as the different roles key stakeholders play, levels of intervention to reduce these barriers or to enhance institutions ability to fulfil their role, differ. It could be argued, for instance, that because government does not have the monetary or other resources to play a strongly interventionist role in the energy services industry, it should rather seek to create an enabling environment that would encourage private sector participation and investment. Our recommendations thus focus on government playing this caretaker-type role. It could, however, be argued that regulation is the most powerful way of encouraging energy-efficiency investment, and that the NER should therefore adopt a more interventionist or market-engaging approach in this area. If so, recommendations should seek to assist the NER in fulfilling this role. Clearly, though, recommendations would be pitched on a significantly different level to those for government. Finally, Eskom and municipal distributors are (or could be) implementing energy-efficiency programmes (as opposed to making policy in this area). By virtue of this, recommendations should focus on enhancing worthwhile implementation and on skills transfer.

5. Recommendations to government

Current priorities in the Energy Branch include: electrification, restructuring of the electricity supply industry, restructuring of the EDI, restructuring of the liquid fuels industry, new gas pipeline development opportunities and new legislation (Energy Bill, Gas Bill, Electricity Regulation Bill, etc). Given the enormousness of these issues, and the associated attention that they will undoubtedly require, it is unlikely from a human resource point of view that energy efficiency will receive adequate attention in the foreseeable future. Indeed, in May 2000, the staff complement of the Energy Branch of the DME was 48 (excluding support and administrative personnel). Budgetary constraints also severely limit the attention staff of the Energy Branch and other governmental departments can devote to energy efficiency. Governmental departments, for example, have not allocated any funds to the Environmentally Sound Low-Cost Housing Team. Thus, even if members of this inter-departmental team do have time to dedicate to thermal efficiency issues, they are financially strapped from doing so. These are clearly barriers inhibiting government from creating an enabling environment for energy efficiency.[2]

We are mindful that government faces tremendous budgetary and other capacity constraints,[3] and that, within these constraints, government has to identify priority activities for immediate attention. For these reasons, we have chosen to present recommendations that we feel take cognisance of these constraints. Our judgement is that it is preferable to present recommendations that are implementable and realistic, rather than ones that cannot be implemented because of insurmountable public sector constraints. Thus, while international experience has been insightful to this research and analysis, in that guidance on what solutions can be sought to reduce particular market barriers, we have also kept in mind that the solutions of industrialised – or other – countries might not be solutions for South Africa.

5.1 Government's position on energy efficiency

Government's position on energy efficiency is documented in the White Paper on Energy Policy (1998), which notes that '[s]ince expenditure on energy constitutes a large proportion of the country's GDP (15%) and a particularly large proportion of poor household's expenditure, it is necessary to give attention to the effective and efficient use of energy. Energy efficiency and energy conservation considerations must therefore form part of an overall energy policy'. A section of this document is dedicated to energy efficiency in industry and commerce, households, transport and government. In addition, the White Paper commits the government to ensuring that an integrated resource planning (IRP) approach for large investment decisions by energy suppliers and service providers is undertaken.

Since the release of the White Paper, the DME has made some progress in reaching the goals presented in the document (see Appendix A). Interestingly, though, progress has been made in areas that were initiated prior to the (i) release of the White Paper (i.e. prior to December 1998) and (ii) to the restructuring of the Energy Branch, in 1998, when a position dedicated towards energy efficiency issues were scrapped. Few, if any, new activities related specifically to energy-efficiency investments have been initiated since this time.[4] This is probably because there is currently no office in the DME dedicated towards promoting energy efficiency in South Africa (see for example Clark and Barberton (1999) as well as Section 5.2.1 below).

Our contention is that government must now decide, once and for all, whether it will seek to protect and promote energy-efficiency investment. If it stands by its White Paper position – i.e. that energy

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2 See Clark & Barberton (1999) for a detailed explanation of other governmental barriers inhibiting investment in energy-efficiency programmes.

3 The budget for the Energy Branch for the year 2000 is R29 million. Of this, R2.5 million is dedicated towards energy efficiency issues.

4 In 1999, the DME awarded the Minerals and Energy Policy Centre (MEPC) a project to assist the DME in building its in-house capacity in Integrated Energy Planning, or Integrated Resource Planning. While both call for an assessment of both demand- and supply-side investment options, these planning approaches do not necessarily involve the actual implementation of public benefit energy-efficiency programmes: various demand-side options are made available during the assessment, yet it is likely that implementors (especially utilities) will seek to invest primarily in options that make clear commercial sense. Interestingly, public benefit energy-efficiency options generally yield significant societal benefits, but may not be in the best interests of individual implementors.

efficiency is a priority for government – then, it should accept the consequences of doing so. This means that it should provide a reasonable budget, human resources and support for activities that will allow for energy-efficiency investment, in particular public benefit energy-efficiency investment. It should be noted that in doing so government does not need to (nor should, in our opinion) become an implementor of energy-efficiency programmes/activities. Rather, it should seek to create an enabling environment for energy efficiency, in so doing, encouraging private sector involvement and investment in this area.

We recommend that if government is to be seen to be a credible leader in the area of energy efficiency, then it must fulfil its commitments as detailed in the White Paper on Energy Policy for South Africa (1998).

5.2 Governance arrangements to promote energy efficiency

5.2.1 The DME's organisational structure must support energy efficiency

In the past few years, senior management of the DME have struggled to identify an organisational structure that supports energy efficiency. Prior to 1997, Energy efficiency staff/programmes were housed in the electrical energy division of the Energy Branch together with electricity, gas and coal. This is illustrated in Table 1 below.

Directorate	*Sub-directorate*
Energy for development	Renewable energy
	Energy for developing areas
	Information dissemination
	Biomass
Electrical energy	Electricity and gas
	Energy efficiency
	Coal
Transport energy	

Table I: Focal research areas of the Chief Directorate: Energy Branch
Source: James & Simmonds (1996)

Table 1 demonstrates the fragmented nature of policy formulation and research administration with the DME. If it is assumed there that the primary beneficiaries of public benefit energy-efficiency programmes are households, then the separation of household energy issues is concerning. These issues fall under the Energy for Developing Areas sub-directorate, while energy supply issues fall under the Electrical Energy directorate. Furthermore, the Energy Efficiency sub-directorate falls under the Electrical Energy directorate, thus limiting policies and strategies to improving electrical energy-efficiency. Within this structure, it was difficult for the Department to develop a national strategy on public benefit energy-efficiency (Simmonds & Clark 1997). Due in part to these and other organisational concerns, the Energy Branch of the DME was re-organised, in 1998. Table 2 below illustrates the organisational structure that was then adopted.

Chief directorate[5]	*Directorate/(sub/directorates)*
Electricity	Electrification (grid and non-grid)
	EDI restructuring and policy
Hydrocarbons	Liquid fuels
	Coal and gas and the environment
Nuclear and Renewables	Nuclear
	Renewables

Table 2: Focal areas of the Energy Branch
Source: Surridge (1999)

[5] Chief Directors are responsible for the cross-cutting issues of black economic empowerment; capacity building; health, safety and the environment and energy efficiency.

This structure, which is also the current structure, assumes energy efficiency, together with black empowerment, capacity building, and education to be 'cross-cutting' energy issues. There is no longer a line function (or an office) for energy-efficiency issues, as there used to be in the previous organisational structure illustrated in Table 1 above. At the time of the inception of this organisational structure, senior staff of the Energy Branch were adamant that this organisational structure should not be taken to indicate that energy efficiency was no longer a priority of government. To the contrary, energy-efficiency programmes – particularly those targeted at the domestic sector – were said to remain key. While energy efficiency does, indeed, concern all aspects of energy, it was argued that, since a dedicated line function (and associated personnel and other resources) for energy efficiency no longer existed, it was in grave danger of petering out. It could now be argued that, given this organisational structure, the DME has done well in the past two years to ensure that projects implemented prior to the launch of the White Paper on Energy Policy have remained on track.

A proposal to further re-organise the Energy Branch is currently being considered by senior management of the DME. It has been mentioned that this organisational structure – if accepted – will include a Deputy Director position dedicated towards promoting energy-efficiency investment and environmental issues. It is proposed that this position be housed in a new Energy Planning Directorate.

> ***We recommend that the proposal to re-introduce a position dedicated towards energy efficiency and environmental issues is adopted and implemented as soon as possible. Like environmental issues, capacity building and black economic empowerment, energy efficiency should be treated as a cross-cutting issue and should not be associated with just electricity but rather with energy in general.***[6]

We recommend that the function of this job include but not be limited to the following:

- to initiate, co-ordinate and drive governmental activities related to energy and thermal efficiency;
- to monitor and evaluate these initiatives;
- to develop and enforce the DME's policy positions in this area;
- to build and strengthen linkages between the DME and its energy regulators, including the NER;
- to support the establishment and work of the proposed National Energy Efficiency Agency.

Thus,

> ***Our recommendation is that the function of this position is to facilitate the creation of an enabling environment for public benefit energy-efficiency in South Africa, and not to become involved in in-depth implementation activities linked with the energy services industry.***

5.2.2 A National Energy Efficiency Agency should be established

As has been noted, the DME has capacity and other resource constraints and, within them, must address a number of priority issues. So the DME's main current responsibility should be creating an enabling environment for energy-efficiency investment in South Africa.[7] Yet South Africa's energy services industry is in its infancy[8] and undoubtedly will require some nurturing by the public sector before it can attract (on a sustainable basis) private sector investments that will grow the market for energy services.

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6 In many ways, this new proposed organisational structure represents a combination of the DME's previous two organisational structures. It combines the position that there should be an office for energy efficiency, and also acknowledges that energy efficiency is a cross-cutting issue.

7 The government cannot afford to do otherwise: it should be promoting energy efficiency, yet it should not be taking a lead role in the implementation of energy efficiency projects.

8 See Appendix B for an explanation of the natural evolution of the energy service industry.

Other countries – including Ghana, Brazil and Thailand – have faced similar dilemmas. With young energy service industries requiring public sector support, coupled with over-burdened, under-resourced government departments (with limited capacity to undertake programmes/activities required to boost this industry, which would then enable government to play a less interventionist role commensurate with the limited resources), some governments have chosen to establish public-sector agencies mandated to promote energy-efficiency investment nationally. Depending on the context and circumstance and agency mandate, these public sector agencies have been mandated to fill the aforementioned gap, as well as conduct other activities (related especially to regulatory requirements). For the most, these agencies have sought to strengthen private sector participation and investment in this area,[9] while also focusing on ensuring that adequate public benefit energy-efficiency investments are made. Thus, these agencies have sought to promote sustainable development in the energy sector through customer education activities (including information campaigns, training, audits and demonstrations), policy advocacy,[10] market transformation initiatives, design and implementation of energy-efficiency investments, and energy research and development.[11]

The NER has stated its intention to require by default that distributors (as well as potential/existing generators and transmittors) adopt IRP principles when assessing new investment decisions. Indeed, the Regulator is requiring that an IRP be submitted to the NER for licence granting purposes. In addition, the Regulator is currently considering whether to make it a systematic requirement that distributors undertake a specific minimal level of investment in public benefit energy-efficiency investment. From the perspectives of the IRP requirement, and even more so, the likely energy-efficiency investment requirement, the establishment of a National Energy Efficiency Agency would also be important. This agency could support these initiatives primarily through:

- assisting the NER in the development of standards of performance;
- assisting distributors in the identification of projects/programmes that comply with the requirements of the NER;
- ensuring that the project/programmes comply with these requirements;
- undertaking market transformation activities; and
- educating residential, commercial and industrial end-use customers.

Clearly, if the NER requires that a minimal amount of investment in public benefit energy-efficiency investment be made, it will have no option but to develop or buy-in skills and capacity in these areas, and in particular with the first three items listed. Without this support, international experience indicates that distributor utilities are very likely to abuse the system and will most probably undertake energy efficiency activities that are in their own best interests, while avoiding investments in public benefit energy-efficiency investments even though they yield wider societal benefits. Thus, if a National Energy Efficiency Agency were established, it could support the activities of both government and the NER in meaningful ways. This inherently means that the interests of customers would then be supported.

If a National Energy Efficiency Agency were established in South Africa, it would be important for government and the NER to ensure that it receive a mandate to act *independently* of all prevailing interests. Experience from other countries indicates that if links between the Agency and these other institutions are too tightly knit, then this type of agency would be in danger of being swayed by prevailing biases. This could be particularly threatening with regard to budgetary allocations or agreements on strategic visions/way forwards.[12] On this note, it is also important that an adequate

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9 Ironically, these public agencies have in some cases 'crowded- out' private sector involvement in this area!

10 For the most, these agencies have been tasked with recommending energy-efficiency related policy to government though they have not been responsible for policy decisions.

11 See Clark (1999) for a detailed discussion of public sector energy-efficiency agency models employed in England and Wales, Norway, New Zealand, Thailand, Ghana and Brazil.

12 In Thailand and Brazil, public sector agencies were established to promote, primarily but not limited to, public benefit energy-efficiency investments. The budgets of these agencies were (and still are) linked with those of the main utilities in the countries. A number of times since both of their establishments, annual budgets have almost

budget for a National Energy Efficiency Agency is secured for at least the first five years of its existence. Due to budgetary constraints within government, it is unlikely that the Agency could or should receive or expect funding from government. Initial discussions with international development aid organisations suggest that there are opportunities for alternative funding arrangements. As has been detailed below, we also make recommendation for the adoption of a public benefits surcharge. Proceeds from this surcharge could pay for aspects of the Agencies activities (i.e. education, training and awareness initiatives, training and audits, demonstrations, verification). If this public benefits surcharge were adopted, international funding should probably be secured mainly for start-up and overhead expenditures of the Agency.[13]

A year or so ago, the DME set in motion the process of determining the feasibility of a National Energy Efficiency Agency. A draft business plan has been delivered to consultants commissioned to investigate this issue. Due to DME priorities and resource constraints, and also a wariness of establishing another public agency (given DME's record with this) this initiative has not been carried forward. It has been suggested though, that a second, more in-depth, study of the feasibility of such an Agency be commissioned.

It would be a great loss to South African society if a National Energy Efficiency Agency were not established primarily because of DME's possible hesitancy with 'independent public sector agencies. If, indeed, this model is of great concern to the DME, then it would be worthwhile (a) assessing the reasons for the mistakes made with regard the NER and REFSA and then seeking ways of taking account of these concerns in the formulation of more acceptable structures and processes, or (b) seeking out alternative organisational structures for an entity that undertakes the work of the nature described above.[14]

> ***We recommend that government initiate a second (this time, more in-depth) feasibility study of a National Energy Efficiency Agency. This feasibility study should take into account the likely impacts that power sector restructuring will have on investment in public benefit energy-efficiency programmes.***

5.3 Other activities to support energy efficiency

5.3.1 Government must continue to develop and implement standards and codes

The White Paper on Energy Policy commits government to establishing codes/norms and standards for industrial equipment, the transport sector, commercial buildings and residential dwellings. Besides entrusting government with various educational and awareness initiatives (such as the development of educational materials), the White Paper also commits government to promoting the introduction of a domestic appliance-labelling programme. To date:

- Government has completed the South African Energy and Demand Efficiency Standard (SAEDES). The SAEDES are now with a technical team within the South African Bureau of Standards (SABS). It is hoped that the SAEDES will become mandatory standards in time.
- The Environmentally Sound Low-Cost Housing Task Team has completed a discussion document on guidelines/recommendations for energy efficiency, water efficiency and urban

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been eradicated because utility sale/revenues had declined in the previous year or because the electricity industry has been in financial disarray.

13 See Section 6.3.2 below for a more detailed discussion of this.

14 In May 2000, Energy Efficiency Enterprises held a workshop to launch the Energy Training Foundation's Core Training Programme (CTP). At this workshop the ETF proposed its solutions regarding energy training in South Africa, and asked stakeholders for input and comment. The event was sponsored by commerce and industry. The Energy Training Foundation was established with a view to undertaking some of the activities that were proposed of a National Energy Efficiency Agency that was proposed but not established. It has been suggested that the Energy Training Foundation will continue to seek out funds from commercial and industrial outfits for commercial and industrial training purposes, but that these funds will also be used to cross-subsidise public benefit energy service initiatives (i.e. those which do not easily attract investment, but which unambiguously yield benefit to society). Even though this type of initiative is truly welcomed, it is clear that its impact would be smaller than if these activities were supported/initiated by a national agency. Perhaps – as government struggles to address all of its priority issues, as well as being faced by huge resource constraints – this is currently the way to go.

greening. This task team has also inputted into a Minimum Norms and Standards document on low-cost housing.

- The DME has transferred its programme on domestic appliance labelling to the Department of Trade and Industry. Little progress has been made in this regard. Eskom is considering taking this programme on again (as a research activity).
- A SADC Petroleum Sub-Committee has been established to investigate fuel standards and specifications for the entire SADC region.
- No progress has been made on establishing energy efficiency standards for industrial equipment.

The development of legislation detailing codes and standards for energy efficiency should be one of government's key activities. This legislation supports and complements other activities of government, and also of the NER. Indeed, as more competition is introduced into the power sector (and therefore as regulatory tools and approaches change), codes and standards will become increasingly important.

We recommend that the government continue and grow its work on standards and codes for energy efficiency. The DME should initiate/co-ordinate these activities.

Areas of work which the Department could concentrate on include:

- ensuring that SAEDES do become mandatory standards;
- lobbying for greater emphasis to be placed on thermal and energy efficiency standards in overall low-cost housing standards;
- ensuring that the appliance-labelling programme has a home, and that developments in the area are made;
- developing standards and codes for industrial equipment; and
- developing monitoring, evaluation and enforcement functions for all mandatory standards and codes.

5.3.2 Government and the NER must work together in the area of energy efficiency

As noted, the energy services industry in which energy services companies (ESCOs) operate is limited. Currently, most energy-efficiency-related programmes and projects are being initiated by Eskom and, to a smaller extent, municipal distributors. As restructuring in South Africa progresses, it is likely that government and the NER will be less likely to rely on these institutions to conduct these programmes and thereby keep the energy services industry alive.[15]

It will become more important that government and the NER work together to create an environment that encourages investment in energy efficiency.

This report suggests that government and the NER consider various policy options and activities. These have been recommended on the basis that they complement and support each other and that together they comprise an integrated strategy that the public sector could employ to support and promote energy-efficiency investment in South Africa. Obviously, if various of the options are not taken up by government and the NER, then the strategy would be considerably weakened, because, in effect, one of the linkages that holds it together would severed. Figure 3 below illustrates this integrated approach. Two obvious examples of this are as follows. Firstly, if the NER puts in place a minimal energy-efficiency investment requirement, then it will be very important that legislation detailing codes and standards for these investments (in households, commerce, industry and institutional buildings) are put in place. Developing codes and standards is the overall responsibility of government. Secondly, it is probable that staff of both the government and the NER will need to lobby for the establishment of the National Energy Efficiency Agency. Without full support of both these institutions, it is unlikely that progress will be made in this area.

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[15] International experience shows these investments tends to fall away on the introduction, or just the threat of the introduction of more competition into the wholesale and retail components of the business. Vertically integrated utilities like Eskom are no longer able to justify these programmes because generation, transmission and distribution industries are de-linked (Clark 1999; Barberton 1999).

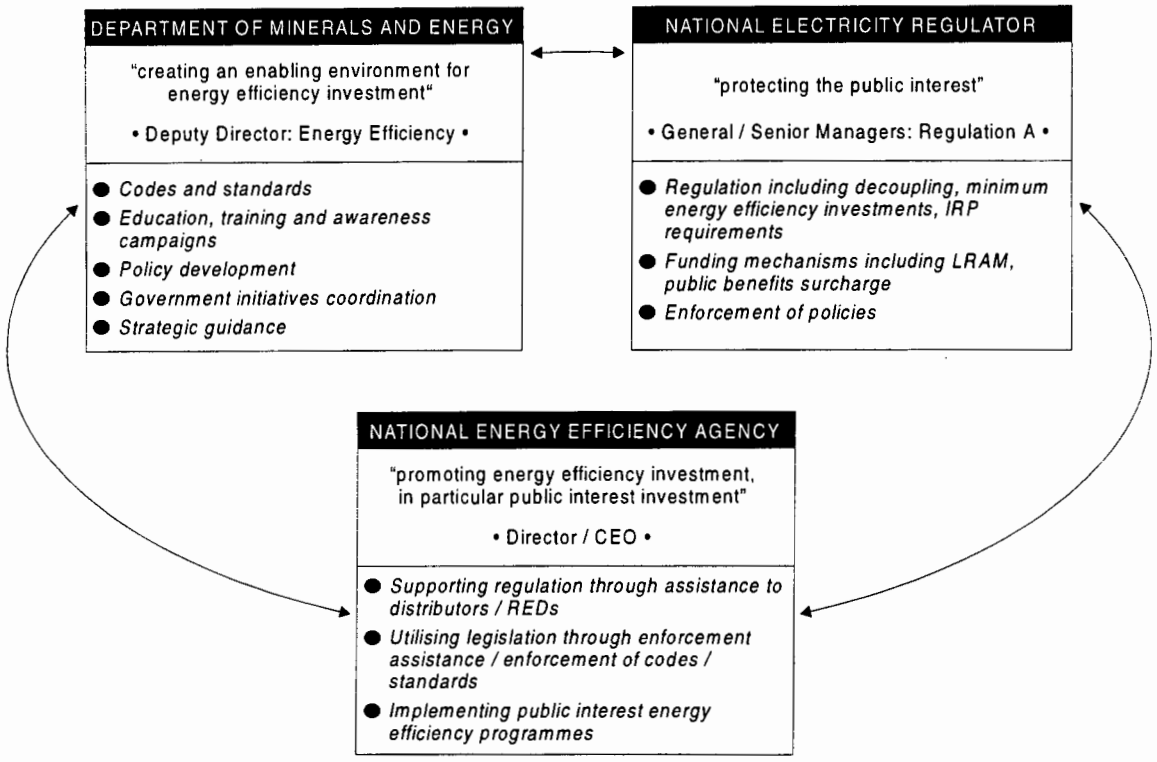

Figure 3: Integrated energy-efficiency strategy for the public sector

We recommend that the DME senior management adopt the proposal to establish a full-time post dedicated towards energy efficiency on the condition that one of the main objectives of this post is to ensure that the DME work closely with the NER on energy-efficiency related issues.

6. Recommendations to the NER

6.1 The NER's position on energy efficiency

In seeking to protect consumer's interests, the NER holds a difficult position. On the one hand, it carries a responsibility for ensuring that the price of electricity remains low; on the other, it must ensure that opportunities for energy-efficiency investment are promoted. Regulators in other countries have attempted to deal with this apparent dilemma in two different ways. Firstly, regulators have chosen to adopt a light-handed approach to energy efficiency, and have relied on market forces to initiate investment in this area. Secondly, while maintaining responsibility for key regulatory functions, they have chosen to assign many of their day-to-day energy-efficiency responsibilities to an independent organisation that is either retained or established for that purpose. We recommend that the NER adopt the latter approach (see recommendation below).

In a similar way in which we suggested that the government creates an enabling environment for energy efficiency, we recommend here that the NER facilitate the creation of a culture within the electricity industry according to which energy efficiency is seen to be an investment that creates considerable social benefits and is therefore a service worth purchasing. Because of the significant market barriers inhibiting investment in this area, we believe that unless this culture is created little investment in energy efficiency will eventuate. In the remainder of this section, we recommend both supportive and regulatory roles for the NER which, if undertaken *in parallel,* could assist it in going some way towards creating this culture.

The recommendations proposed to the NER in this report are based on the commonly held opinion that, as the power sector reforms, regulatory tools will become the most powerful means of ensuring

that public benefit energy-efficiency investment is made.[16] Indeed, the position that the NER takes in this area will be the key determinant of the 'shape' of energy-efficiency investment in South Africa for many years to come. It could be argued that the recommendations made in this section are too ambitious and difficult to adopt/implement given prevailing circumstances. The counter-argument to this is that if appropriate regulations are not put in place to ensure adequate investment in this area then it is very unlikely that this investment will occur.

> ***We recommend that the NER make a decision on whether it will seek to support investment in public benefit energy-efficiency. Broadly, this would entail the creation of a regulatory framework in which supply- and demand-side investments are both valued, and therefore considered.***
>
> ***We recommend that the NER play a lead role in developing a culture of investment in public benefit energy efficiency. This should be done through close involvement in policy development and advocacy in this area, but through leaving the various supportive, enforcement, monitoring and evaluatory functions, as well as implementation of a public-interest programmes, to the National Energy Efficiency Agency.***

In the remainder of Section 6, we adopt a three-pronged approach. First, we will make the suggestion that the NER ensures that the regulatory framework that it adopts in the future does not disincentivise energy-efficiency programmes. In other words, our recommendations seek to remove disincentives for energy-efficiency investment. Second, we make suggestions on how the NER can ensure that a minimum amount of investment in energy efficiency is made. Thirdly, we suggest to the NER ways of incentivising energy-efficiency investments.

6.2 Regulatory measures to support energy efficiency

6.2.1 The NER should seek to remove disincentives to invest in energy efficiency

Currently, the NER bases its tariff-making decisions on a combination of benchmarking exercises, rate-of-return regulation and performance-based regulation. In other words, the regulatory framework adopted by the NER follows neither rate-of-return regulation nor a price-cap approach in their purest senses. It seems likely – in new electricity contexts – that the decisions of NER will be more clearly linked to a performance-based regulatory regime (though until retail competition is introduced into the distribution industry it is likely that some benchmarking will continue to occur).

In developing a new approach to regulating the electricity industry, we recommend that the NER move away from including mechanisms in the regulatory framework which disincentivise utilities from investing in energy-efficiency programmes. Regulatory tariff structures, for instance, often link energy sales (kWh) with utility revenues and profits. This is a clear disincentive for the utility to engage in any DSM that can reduce sales. As a means of overcoming this disincentive, regulatory authorities have designed tariff structures (and revenue allowances) such that the income to the utility is not dependent on sales volume (in kWh) but on some other measure of service (such as growth in number of customers, or estimated sales based on an attrition mechanism).[17] In other words, instead of letting revenues grow with increasing kWh sales, regulators allow revenues to grow with other factors that are independent of changes in actual electricity use. Regulators use decoupling mechanisms to achieve this result. These mechanisms partially or fully remove both the incentive to increase electricity sales and the disincentive to run energy-efficiency programmes. Simply put, regulatory authorities periodically set tariffs for utilities. During each of the years between when tariffs are set, utilities collect any extra revenues associated with sales higher than those forecasted (or deficient revenues associated with sales below the forecast) in a balancing

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[16] Experience from other countries indicates that it is particularly important for Regulators to specify what type of energy-efficiency investment is required (see Section 6.2.2). Here, as noted, the focus will be on public benefit energy-efficiency investment.

[17] This mechanism adjusts the components of fixed costs on the basis of various endogenous factors (that are not controlled by the utility) such as inflation rates and other costs and productivity indices. The attrition mechanism includes financial (e.g. cost of capital), operational (e.g. wage rates and costs of certain materials) and rate-base (e.g. additions/subtractions from the utility's rate base) adjustments.

account. During the following year, these excess (or deficit) revenues are refunded to (or collected from) customers by decreasing (or increasing) the price of electricity.[18,19]

We recommend that through decoupling and other mechanisms, the NER, seek to ensure that utilities' profits are not linked to revenues and sales.

We are of the belief that this decoupling process will represent an important means of assisting the NER in the development of a culture of interest in energy-efficiency investment.[20] Indeed, decoupling has been shown to be an important prerequisite for transforming utilities from sellers of an energy commodity to providers of energy services.

6.2.2 The NER should require a minimal amount of public benefit energy-efficiency investment

If government is able to re-affirm that energy efficiency is a key priority for it, then it follows that the NER must require that distributors (either current municipal distributors or forthcoming REDs) undertake a certain amount of investment in public benefit energy-efficiency investment. As noted above, international experience indicates that if this requirement is not specified then it is highly unlikely that this investment will voluntarily occur.[21]

On requiring that this 'minimum' amount of investment in energy efficiency, regulators around the world have generally also established 'standards of performance' or guidelines which are then issued to distributors to assist them in making the appropriate amount and nature of investment. Regarding the appropriate amount of investment, regulators generally call for a percentage of annual revenues or distributed energy to be spent on energy-efficiency programmes/projects.[22] Regarding the nature of investment, standards of performance have generally linked distributor activities to codes and standards set out in legislation, as well as to formal linkages established between distributors initiating the investment, and an independent energy agency (see Section 5.2.2).

Experience from different countries stresses the importance of providing careful details on the precise nature of the energy-efficiency investment requirement stipulated by the standards of performance. Insightful experience comes from Brazil in this respect. The Brazilian Regulatory Authority, ANEEL, has specified in all of the Terms of Sale of public utilities to private sector partners that the latter must spend 1% of annual revenues (sales less taxes) on energy-efficiency investments. The Terms of Sale further specify that this investment should be broken up as follows:

Total regulated investments (A) ≥ 1.00 % of total annual revenues		
End-use efficiency (B)	**Research &development (C)**	**Supply-side efficiency (D)**
≥ 0.25% Annual Revenues • <0.125 % public lighting, marketing • ≥ 0.025% public sector • ≥ 0.025% industrial sector • ≥ 0.025% residential sector	≥ 0.1 % Annual Revenues • Energy Planning • Alternative Energy Sources • Quality of Services • Co-generation	(A) – [(B)+(C)] • > 10 to 30 % load factor improvements • Reduction of commercial losses • Reduction of technical losses

Table 3: ANEEL Resolution 261

18 These particular revenue adjustments only deal with *fixed* costs.

19 For a more detailed description of decoupling mechanisms, as well as a discussion of the differences between decoupling and net lost revenue adjustment mechanisms see Appendix C.

20 More correctly, this section on 'decoupling sales from profits' should appear in the section on financing mechanisms below. As a means of explaining how the NER should broadly position itself, however, it has been place in this section on regulatory tools.

21 The possible alternative, or better still, complement to this, is the introduction of the public benefits surcharge. See Section 6.3.2 for more details on this.

22 In England and Wales, the merged Office of Electricity Regulation and Office of Gas Supply require that Regional Electricity Companies (RECs) achieve certain energy saving levels. By virtue of *Standards of performance I: (1994-1998)*, RECs were required to achieve 0.675% of distributed energy. In Brazil, privatised distributors are required by ANEEL Resolution 261 to spend at least 1% of total annual revenues.

An assessment of regulated investments for a number of Brazilian utilities indicates that legal requirements for end-use, and research and development investments are generally *just* met. Most of their investments, however, are being channelled into programmes that aim to reduce commercial losses and to increase profit margin (in other words, those specified by column D in Table 3 above).

It is suggested that it is only natural for utilities to adopt the approach chosen by utilities in Brazil and elsewhere – i.e. to be economically efficient and competitive. Thus, it may be seen to be excessive for regulation concerning mandatory supply-side efficiency investments to be developed. Rather, it may only be important to mandate investments in public benefit energy-efficiency programmes/projects. In following this approach, the NER will need to identify the energy-efficiency (and other) areas that utilities are *not* likely to invest in. It might also be appropriate for the NER to determine which public benefits are priority ones. Thus,

> ***We recommend that the NER develop Standards of Performance which detail the nature and value of the minimum public benefit energy-efficiency investments which municipal distributors or REDs would be obligated to initiate.***
>
> ***We further recommend that the NER assess different stipulations of this requirement (for instance through total annual revenues, through distributed energy, through customer base etc).***

The case of Brazil is also interesting from the point of view of the enforcement of these regulated investments. As is the case in South Africa, in Brazil the regulatory tradition is not strong, and regulatory authorities are still being organised and trained. Brazil is also a country in which a competitive energy market must be created, powerful lobbies must be controlled and public interests must be protected. Unfortunately, public interest issues are therefore frequently not on the priority lists of energy sector stakeholders and decision-makers. Regulatory authorities are under-resourced, and still have to develop an ability to enforce and evaluate the progress of investments in utility managed programmes. South Africa, like Brazil, is still in the early stages of this learning curve.

> ***We recommend that the NER either develop in-house capacity to ensure that the minimum energy-efficiency requirements meet criteria as detailed in the Standards of Performance or that it retain the services of the (proposed) National Energy Efficiency Agency to do so.***

A combination of these two options would probably be optimal. In this regard, the NER would seek to develop limited in-house capacity to administer, analyse or take strategic decisions in this area, but rely principally on the services of a National Energy Efficiency Agency to support municipal distributors or REDs in this process.[23]

It should be noted that this recommendation to establish minimum energy-efficiency requirements is done in full cognisance of the stipulations of the NER that all large investment decisions should be based on principles of IRP, and that local, national and regulator IRPs should be undertaken (and periodically submitted to the NER by distribution, transmission and generation businesses. Even though we are aware that IRPs require assessment and integration of both supply- and demand-side options, we have made this additional recommendation to ensure that (a) a specific type of demand-side investment is undertaken – i.e. public benefit energy-efficiency (indeed, it is unlikely that an IRP would include public benefit energy-efficiency programmes); and (b) that programmes, projects and policies are in fact implemented and not just planned.[24]

A culture based on the widespread belief that energy efficiency is worthwhile will not be created if utilities are unsupported in their attempts to initiate investments in this area. This support should come from the public sector in various different ways. Government should create an enabling environment for energy-efficiency investment (as explained in Section 5). The NER's most powerful way of contributing to the development of this culture is through utilising of various regulatory mechanisms which enable utilities to recover the costs of public benefit energy-efficiency programmes, recover lost revenues associated with these programmes, or even profit from DSM programmes. Recommendations on the way forward in this area are presented in Section 6.3 below.

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[23] See Section 5.2.2 for details of proposed activities for the National Energy Efficiency Agency.

[24] International experience indicates that for licence requirements, utilities often show demand-side options in IRPs but then do not implement them.

6.3 Financing mechanisms to support energy efficiency

In this section, recommendations are made to the NER (and government), on how to create incentives to invest in energy-efficiency programmes. We address ways of financing mandatory energy-efficiency programmes (as recommended in Section 6.2 above), and pay for lost revenues and programme costs incurred by utilities when undertaking these energy-efficiency programmes.

6.3.1 The NER could establish mechanisms for utilities to recover programme costs and lost revenues

When utilities undertake energy-efficiency programmes, they incur various costs including: (i) those directly associated with the programme (equipment purchases, subsidies etc), (ii) running costs (salaries, administration overheads etc), and (iii) lost revenues occurring as a result of these programmes. In this section, we make recommendations on how the NER may enable utilities to recover the costs described in (ii) and (iii) above, while section 6.3.2 begins to address ways of paying for the costs described in (i) above. *The discussion below focuses on mechanisms to recover lost revenues. Generally, mechanisms to recover programme costs are similar in that programme costs are recouped through tariff adjustments but are usually simpler in that it is often unnecessary to establish a balancing account in an assessment of costs.*

International and local experiences indicate that *lost revenues* are generally the largest negative financial consequence of a successful energy-efficiency programme in the short run and hence it is important for regulatory authorities and utilities to come to agreement on how these lost revenues will be treated. It is likely in South Africa that utilities, with or without specific directives or obligations to make investments in energy-efficiency programmes, will approach the NER for assistance/support in this specific area. This section focuses on possible mechanisms to address these lost revenues.

Some regulators have employed *net lost revenue adjustment mechanisms* (NLRA) to make provision for lost revenues. Extensive experience of NLRA mechanisms comes from the United States. Other countries which have prioritised energy-efficiency investments have tended to rely on providing financing for direct programme costs but not for lost revenues. Indeed, regulatory authorities in these countries have:

- introduced special revenue allowances (payable by customers) that utilities can draw from to finance direct costs of energy-efficiency programmes (see Section 6.3.2 below); and/or
- maintained the position that the spin-off effects associated with these programmes (i.e. customer retention, opportunity to undertake marketing/promotional activity etc.) more than make up for these revenue losses.

NLRAs are generally the most prevalent way utilities have been compensated for changes in revenues associated with utility DSM programmes. While there are a number of generic types of NLRA mechanisms,[25] the mechanism agreed upon in most cases is related to context, and is usually unique to others. To implement an NLRA, the utility first estimates energy and load reductions caused by its DSM programmes for the year in question. These GWh and MWh savings are then multiplied by the difference between the retail price and short-term costs (both energy and capacity) and the two products (lost energy and lost capacity revenues) are added together. This sum is the net lost revenue caused by the utility's DSM programme. It is called 'net' because it is equal to the difference between the reduction in utility revenue minus the reduction in utility costs (fuel and variable O & M costs). In a similar fashion to decoupling (see Section 6.2.1 above), a balancing account is then utilised to enable utilities to recover lost revenues through tariff adjustments. The basis for a NLRA surcharge on a customer's bill can differ. A single surcharge may be applied to all customers, or the surcharge may differ by customer class, depending upon how the regulator decides to allocate revenue recovery costs. If the NER were to develop a NLRA mechanism in South Africa, it is recommended that equity and poverty issues be taken account of.

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[25] There are three broad categories of NLRA mechanisms. These include the (i) prospective surcharge mechanism which recovers lost revenue as a result of *current* DSM programme-year activities; (ii) the retrospective surcharge which is designed to recover revenue lost from DSM activity in a previous year or years; and (iii) the deferred account mechanism which uses a tracking mechanism that records monthly net lost revenue estimates. The utility then receives authorisation to recover this estimated net lost revenue at its next tariff review.

NLRA mechanisms are problematic for utilities and regulators in today's environment because net lost revenue from DSM programmes tends to accumulate over time, so that the sustained use of NLRA mechanisms may lead to higher tariffs. In essence, NLRAs effectively address short-term problems of revenue losses between the times in which tariffs are set, yet do not address a long-term problem which is that energy efficiency erodes the revenue base of the utility. Ultimately, this erosion will result in fixed costs being spread across a smaller revenue base than the utility would experience without DSM.

A partial solution to this is for utilities to develop programmes that reduce or eliminate adverse tariff impacts. Utilities can lower programme costs by reducing customer incentives, for example, or by moving incentive programmes to information and financing assistance. Tariff design changes can also reduce the impact of DSM programmes on tariffs and fixed-cost recovery. Increasing the percentage of fixed costs to the monthly demand charge, for example, will reduce both the price impact and net lost-revenue impact of DSM. NRLAs can also evolve in response to changing industry conditions. Regulators may cap the total net lost revenues that a utility can recover over a specified period. Alternatively, regulators can allow recovery of a portion of lost revenues from DSM. Another option is setting a time limit on net lost-revenue recovery (up to three years?). Utilities concerned about tariff impacts may choose to forgo net lost revenue recovery altogether and instead recover only programme costs or performance incentives.

> ***We recommend that the NER undertake a critical assessment of NLRAs. This assessment should include investigations of the economic, administrative and institutional implications of establishing such a mechanism. The decision whether the NER should establish NLRAs should be linked closely with the decision whether the NER supports the establishment of the public benefits surcharge (see Section 6.3.2). Even though the NLRA and the public benefits surcharge would finance different aspects of utilities' energy-efficiency investment, it is recommended that the NER does not do both.***

International experience indicates that, as more competition is introduced into the electricity wholesale and distribution, NLRA mechanisms become less useful. The fundamental reason for this is that competition brings with it downwards pressure on prices. Even though NLRA mechanisms are available to utilities, they are loath to take them up (and therefore invest in energy-efficiency programmes) because NLRAs generally result in tariff increases which could mean lost utility business. For this reason, countries, including some of the United States, have introduced a public benefits surcharge (see Section 6.3.2 below).

6.3.2 Utilities should not profit from their public benefit energy-efficiency investments

In attempting to provide incentives to utilities to invest in energy-efficiency programmes, some regulators (and mainly in the United States) have allowed utilities to earn a 'reasonable rate of return' on DSM investments. This policy represents an attempt by regulators to provide a level playing field for supply- and demand- related investments. In this regard, regulators have allowed utilities to profit from DSM programmes in the following ways:

- *Shared-savings mechanisms.* The shared-savings incentive mechanism provides utilities (or their shareholders) with a share of the energy savings benefits, or 'net benefits'. Shared savings are the most common mechanism used to reward utilities for investing in DSM programmes.
- *Bonus mechanisms.* Bonus mechanisms reward utility shareholders on a per-unit basis for energy and demand savings. Bonus mechanisms are less common than shared savings.
- *Mark-up mechanisms.* Mark-up mechanisms provide a mark-up on DSM progamme expenditures, generally varying from five to ten per cent. Mark-up mechanisms frequently apply to a subset of utility programmes, where energy savings benefits are particularly difficult to measure (i.e. information programmes) or where the programmes undertaken are based on equity rather than efficiency considerations.

> ***We recommend that the NER does not allow utilities to profit from energy-efficiency investments either through mark-up or bonus mechanisms. The NER does not have the capacity to administer these mechanisms. Additionally, these mechanisms can invite regulatory abuse and programmes that look good on paper but do not achieve the desired results.***

6.3.3 A non-bypassable systems-wide public benefit surcharge could be created

To sustain productive public benefit energy-efficiency investment during the transition period of the electric utility restructuring, a very promising solution lies in the adoption of a *non-bypassable systems benefit charge* on electricity distribution services. Traditionally, the public benefits charge has been regulatory authorities' solution to providing public benefits where retail competition has been introduced. This 'new' cost recovery approach does not necessarily require a change in current tariffs, tariff structures or cost allocations amongst customer classes. Regulators around the world have merely been making it explicit that those who use integrated power systems cannot bypass their share of contributions to system benefits by designating a new supplier of kilowatt-hours over the integrated grid.

Such charges are generally based on usage (kWh), demand (kW) or lump sum by virtue of being a customer, and are generally utilised to pay for various public benefits including energy efficiency, programmes for low-income households, energy R&D, and renewables. The surcharges employed internationally have generally been small, to the extent that they are hardly recognisable on the bill.[26] Generally, regulatory authorities have obliged distributors to collect this special revenue allowance. Depending on the regulatory directive, distributors have either then spent these funds in appropriate fashion, or have been directed to forward the funds they have collected to the regulatory authority which has then re-distributed these funds where appropriate.[27]

> ***Our recommendation is that the NER undertake a detailed analysis of a potential public benefits surcharge. The analysis should investigate (i) how this public benefits charge should be collected and spent; (ii) what the charge per customer should be in order that adequate funds can be raised; (iii) what this charge should be spent on (energy efficiency, research and development, renewable energy, etc); (iv) what the role of the NER in this would be; (v) who should pay this charge. The analysis and decision should be taken in close conjunction with the decisions as to whether a National Energy Efficiency Agency be established, and whether NLRA mechanisms should be established.***

Our initial impression is that the public benefits surcharge is the way forward for the NER, and not just for the sakes of energy-efficiency investment but for a number of public benefit programmes as mentioned above. Over the next few years, more competition will be introduced in various ways into the power sector in South Africa and this pubic benefits surcharge is a way of ensuring that public benefits can realistically be provided for in these contexts. If implemented, the surcharge should be designed so as to take account of South Africa's skewed income distribution (perhaps the poorest households in South Africa should not be subject to it). Distributors (in the future, REDs) should probably collect the surcharge, and either spend the funds appropriately, or forward these funds, in part on in whole, to the NER for redistribution. It would make sense that a proportion of these funds be allocated to the National Energy Efficiency Agency but that these funds are spent on the actual implementation of national programmes, and not on running/overhead costs.

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[26] During the period 1994 to 1998, the Office of the Electricity Regulator required that Regional Electricity Councils (distributors) collect £1 per customer (i.e. 25p per year collected over 12 months). In Norway, distributors were obligated to collect 0.0003NOK/kWh.

[27] In England and Wales, the Regional Electricity Councils retain these funds and spend them accordingly. In Norway, the 'wires' charge is collected by distributors but transferred to Regional Energy Efficiency Centres to be spent in unbiased fashion. In the United States, regulatory authorities initially allowed the distributors who had collected these funds to spend them appropriately. Later, when it was recognised that utilities should not necessarily administer public funds, utilities were obligated by state regulatory authorities to collect the funds and then forward them to the regulator. The Regulator would then distribute these funds – in some cases, these would go back to the distributor while in other cases these funds would go to an independent energy agency responsible for undertaking public benefit energy-efficiency investment. Lately, large industrial customers whose contribution to these funds has been substantial, motivate for some of these funds being returned to them in order that they are able to finance some of their so-called public benefit energy-efficiency investment (Clark 1999).

6.4 Other activities to support energy efficiency

6.4.1 The NER should begin to learn now how regulatory mechanisms could work

There has been a great deal of experience internationally on ensuring that public benefit energy-efficiency investment occurs. For the most part, success in this area has come about after many years of learning and experimentation. South Africa can draw from these rich experiences to a certain extent but should also acknowledge that we can only hope to get it right through implementation and learning.

As more competition is introduced into the power sector, investments in public benefit energy-efficiency programmes are generally considerably reduced. We have been expecting this reduction in investment in South Africa. Currently, there is still some interest in utility-induced energy-efficiency programmes. Indeed, Eskom alone recently committed R50 million towards the Efficient Lighting Initiative, towards a R65 million public benefit energy-efficiency programme for the next three years. Current opportunities – such as this one – should be capitalised upon by the NER so that when the next round of licences are to be issued, it will be ready to launch into full-scale energy efficiency policy implementation.

> ***We recommend that the NER begin now to test regulatory mechanisms to promote public benefit energy-efficiency programmes.***

The NER need not feel concerned that what it does now will represent its policy stance in the future. Indeed, there seems to be a good understanding within the industry that these types of initiatives are new to South Africa and that a period of learning is necessary. Initiatives of the NER should be done on a trial (or project-by-project) basis until the Regulator has more of a sense of how this process is best approached. The bottom line, though, is that the Regulator should begin to test possible mechanisms while the opportunities are still available (i.e. before competition is introduced).

6.4.2 The NER should support and employ the services of a National Energy Efficiency Agency.

In Section 5.2.2, we recommended that a National Energy Efficiency Agency be established. As noted, this agency would seek to support (and take pressure off) government activities in this area, as well as those of the NER.

The establishment of a National Energy Efficiency Agency would be particularly important if the NER were to:

- *require a minimum amount of energy-efficiency investment,* because there must be a function, institution or capacity to support distributors in identifying/designing/implementing projects, as well as enforce standards of performance (see Section 6.2.2 above);
- *include a public benefits surcharge in the regulatory framework,* because there will need to be capacity and guidance to administer, spend these funds, as well provide guidance on how to do so. Some argue that as more competition is introduced, utilities become less objective in their ability to administer public funds (see section 6.3.2 above).

The National Energy Efficiency Agency could also support the NER in developing standards of performance, and strengthening communication with the DME.

6.4.3 The NER should work closely with government in the area of energy efficiency

See section 5.3.2. above.

7. Recommendations to Eskom and municipal distributors

In this section, recommendations are made to both Eskom and municipal distributors on how to ensure that public benefit energy-efficiency investment occurs now and as more varying degrees of competition are introduced into South Africa's power sector. In other words, this section suggests interim policy positions and activities for interim as well as end-state electricity industry contexts.

7.1 The distribution industry's position on energy efficiency

Internationally, the role of utilities in the initiation and/or implementation of public benefit energy-efficiency programmes is changing. It is argued, on the one hand, that energy-efficiency investment is best handled by utilities because utilities know their customers, their energy usage patterns, and have developed sophisticated payment collection mechanisms. On the other hand, it is argued that utility investments are shaped by their bottom lines and therefore utilities cannot be objective. What, for instance, is to prevent utilities applying public funds to general marketing or customer retention programmes? Others contend that, just as multiple decision-makers cannot operate a transmission system reliably, utilities are unequipped to orchestrate a diversified mix of resource for meeting the economy's electrical service needs at the lowest possible life-cycle costs. Thus, it is questioned whether utilities should remain responsible for managing public benefit programmes, and particularly for administering public funds designated for social benefits.[28]

Even if evidence suggests that it is not entirely appropriate for utilities to administer public funds, no other implementing agency appropriately able to do this usually exists. While it has been suggested that energy service companies (ESCOs) take on this role, the facts remain: ESCOs are usually private companies, profit-oriented, only able to undertake activities that make a direct contribution to the financial performance of the concern, and probably less suited to this activity than are public-owned utilities.

Regulatory authorities around the world have generally dealt with these concerns by requiring that utilities undertake some public benefit energy-efficiency programmes but that mechanisms are put in place to ensure that this investment is genuine, and does not just look good on paper. Recommendations that follow in this section assume that this type of course of action will be taken in South Africa – that distributor utilities will be required to undertake some amount of public benefit energy-efficiency investment, and will be given regulatory and governance support to do so.

Clearly, the role of Eskom, municipal distributors, and at some future stage REDs, will be to implement public benefit energy-efficiency programmes. Less clearly, these distributors are and will be in strong positions to lobby government and the NER for the establishment of a context conducive towards investment in energy-efficiency investment.

7.2 Implementation to support energy efficiency

7.2.1 Eskom should continue to develop capacity to undertake energy-efficiency DSM activities

Of all distributors, Eskom's Distribution Group (in particular, the Marketing Group) has had the most experience in designing and implementing public benefit energy-efficiency programmes in South Africa. This is not only due to Eskom's monopoly status but also because of the benefits it has been able to derive because it is a vertically integrated utility. Eskom's extensive experience – which in effect is national experience – in this area must continue to grow.

> ***We recommend that, in addition to growing its capabilities in DSM implementation, Eskom must also begin to transfer its skills and experience in this area to other municipal distributors.***

The rationale for this is two-fold. Firstly, it is important, for the success of Eskom's public benefit energy-efficiency programmes, that municipalities are on board. Municipal distributors are one of South Africa's key delivery channels of these programmes. Without their participation, programmes of this nature have very little chance of succeeding. In light of government plans for the rationalisation of the EDI, it makes sense, secondly, that Eskom transfer skills in this area to municipal distributors. Indeed, government's model is to remove distribution from Eskom, and to amalgamate it with a small number of REDs which also include regional local authority groupings. Because, in the foreseeable future, Eskom Distribution and local authorities will be working side-by-side, it makes sense for skills transfer to occur sooner rather than later.

Eskom could transfer skills in this area to municipal distributors in two different ways. Firstly, it could work with municipalities on specific initiatives – the most obvious current one being the Efficient

[28] 'Public funds' generally refer to those collected through a non-bypassable systemwide public benefits surcharge as described in section 6.3.2 above.

Lighting Initiative. One of the objectives of ELI should be to work with municipalities, not just to ensure that this channel for delivery is working fluidly, but also to ensure that municipalities gain knowledge and skills in this area in the process. A second way in which Eskom could transfer skills in this area is through national or regional workshops organised with a specific mandate to provide training/skills transfer in various areas, including financing arrangements, programme design, project management, training programmes, project implementation, community participation and so on.

7.2.2 Eskom and municipal distributors should seek to strengthen capacity in delivering public benefit energy-efficiency programmes

There are two broad reasons why Eskom and municipal distributions should seek to develop capacity and programmes in this area. First and most important, public benefit energy-efficiency programmes deliver real and positive benefits to society. The delivery of these public benefits can only improve relationships between service providers' and customers. Energy-efficiency services are also an important way in which service providers can mutually differentiate the service that they provide. This 'edge' is particularly useful when competition is introduced into the retail industry, and thus when retailers compete against each other for business. Secondly, while the regulatory framework to be employed by the NER in the future is uncertain, it is likely that it may involve some benchmarking (or comparative regulatory) practice. If some municipal distributors or REDs are conducting successful public benefit energy-efficiency programmes, then it will be expected that others should do the same.

7.3 Funding options to support energy efficiency

It is likely that if the NER requires municipalities, Eskom or REDs to invest in public benefit energy-efficiency programmes, then it will also put in place mechanisms to support this investment. 'Funding' mechanisms could include decoupling mechanisms (profits are de-linked from sales/revenues), or net lost revenue adjustment mechanisms (net lost revenues are compensated for through tariff adjustments). The NER might also seek to establish a public benefits surcharge that would be used to finance aspects of these public benefit energy-efficiency programmes (see section 6 above). Institutional mechanisms adopted by the NER might include the establishment of a National Energy Efficiency Agency, or the support of the DME.

The finances that municipal distributors, Eskom and, later, REDs will need to raise will, of course, depend on the mechanisms – if any – that the NER chooses to adopt. If the NER adopts net lost revenue adjustment mechanisms, distributors will not have to find funds to compensate the utility for lost revenues. If the NER introduces a public benefits surcharge, it is likely that this will be used for programme implementation (not start-up or overhead costs, but rather costs directly associated with the implementation of energy-efficiency programmes). The NER might also allow utilities to recover programme costs in the form of periodic tariff adjustments. It is unlikely, however, that the NER will introduce all of these mechanisms. This means that distributors will have to seek out funds to support cost components that are not addressed. In addition, depending on how frequently tariffs are reviewed, utilities might need to seek out bridging finance for programmes.

Distributors should keep in mind that the spin-off effects of these programmes could more than compensate distributors for costs incurred. These spin-off effects include an increased ability for utilities to retain and grow its customer base, and significantly improve customer services.

7.4 Lobbying to support energy efficiency

7.4.1 Eskom should begin to market the 'energy efficiency' concept to other municipal distributors

As noted previously, Eskom Distribution has probably had the most experience of all distributors in designing and implementing public benefit energy-efficiency programmes. It was also noted that Eskom should begin to transfer skills and expertise to municipal distributors. Because energy-efficiency programmes often result in a negative revenue impact for distributors, they are generally loath to voluntarily undertake these programmes. Thus, it would be important for Eskom, prior to any skills transfer activities, to work with municipalities to explain how energy-efficiency programmes can result in benefits to distributor utilities. This could be done in various ways, the most obvious being for Eskom to assist municipal distributors in undertaking economic analyses of the impact of

energy-efficiency investments, and thereafter conducting examinations of the results/implications of the analyses.

7.4.2 Eskom and municipal distributors should lobby the NER and government for environments conducive to investment in energy efficiency

If the NER makes it a requirement that Eskom, municipal distributors and/or REDs undertake a minimum level of investment in energy efficiency, then it will be in the distribution industry's interests to ensure that the 'environment' in which they will be operating is conducive to such investment. As the NER moves on the development of policy in this area, we recommend that the distribution industry lobby for the establishment of a conducive environment.

As noted in Section 6 above, there are various ways in which the NER can support investment in energy efficiency. Firstly, it can establish mechanisms to support programme costs (overhead costs etc). Secondly, through net lost revenue adjustment or decoupling mechanisms, it can allow distributors to recover lost revenues associated with energy-efficiency programmes. Thirdly, a public benefits surcharge can be established. This surcharge would be collected directly from customers on a per customer or energy usage basis and would be utilised to pay for the implementation of energy-efficiency programmes (and *not* programme costs). The distribution industry should now lobby for the establishment of one or more of these mechanisms: we are of the opinion that this is one of the most important activities that it could currently engage in. Short-term efforts could have considerable longer-term benefits.

7.4.3 The distribution industry should lobby for the establishment of a National Energy Efficiency Agency

If, in the future, the NER requires it of the distribution industry that a minimum level of investment in energy efficiency is undertaken, then it will be in the interests of this industry to lobby for the establishment of a National Energy Efficiency Agency (see section 5.2.2 above), which could be of great assistance to municipal distributors, Eskom and/or REDs in implementing these investments. Important roles of the National Energy Efficiency Agency vis-à-vis energy-efficiency investment by the distribution industry include:

- assisting the distribution industry in identifying energy-efficiency programmes consistent with the standards of performance of the NER;
- developing generic education and awareness campaigns which can be utilised by the distribution industry;
- supporting communication between the distribution industry and the NER and government.

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Appendix A
Energy efficiency policies and progress (1998 – 2000)

POLICY	PROGRESS (as of May 2000)
Energy efficiency in industry and commerce	
Government will promote an energy efficiency awareness amongst industrial and commercial energy consumers, and will encourage the use of energy efficient practices by this sector	• Green Buildings for Africa is progressing (CSIR, IIEC, DME) • EU ETSU Project with the title 'Industrial Energy Efficiency Information Dissemination Phase 2' will provide case studies which will create awareness.
Government will establish energy efficiency norms and standards for commercial buildings	• South Africa Energy and Demand Efficiency Standard (SAEDES) has been completed and is with SABS technical committees to become a mandatory standard in due course. A project to investigate the feasibility of and savings obtained by implementing the SAEDES is progressing well. • Market survey (assessing potential savings) of the pulp and paper industry has been undertaken • Green Buildings for Africa is progressing (CSIR, IIEC, DME)
Government will promote the performance of audits, demonstrations, information dissemination, sectoral analyses and training programmes	• EU ETSU as above • Energy and Efficiency Educational Material for the Curricula at Primary, Secondary and Tertiary and Industrial Levels is being developed
Government will establish energy efficiency standards for industrial equipment	• No progress
Government will implement an energy-efficiency programme to reduce consumption in its installations	• No progress
Energy efficiency in households	
Government will promote energy efficiency awareness in households and will facilitate the establishment of relevant standards and codes of practice for the thermal performance of dwellings, the inclusion thereof in the national buildings' codes, and will promote their implementation through appropriate measures.	• Energy Week (May 1999) created awareness • Environmentally Sound Low-Cost Housing Task Team has inputted into a Minimum Norms and Standards document on low-cost housing
A programme of education will be initiated for decision-makers such as designers, financiers, builders and home-owners, dealing with the costs and benefits of building dwellings with good thermal performance	• No progress
Government will promote the introduction of a domestic appliance-labelling programme	• Dealt with in working document by National Domestic Energy Efficiency (NADEE) Task Team (Energy Efficiency Enterprises) • Programme has been transferred to the Department of Trade and Industry under Ms Busi Chauke.
Energy efficiency in transport	
The DME will advise other government departments, particularly the Departments of Transport and Finance, on the energy efficiency implications of alternative transport modes and public transport subsidy policies, and will provide assistance in the formulation of fiscal and transport policies to promote energy conservation and efficiency.	• The vehicles emissions project phase 3 is currently in progress • No other progress
The DME will provide information on the fuel use characteristics of new vehicles	• A SADC Petroleum Sub-Committee has been established to look at fuel standards and specifications for the entire SADC region.

Energy efficiency and government capacity	
Government will investigate the establishment of appropriate institutional arrangements infrastructure and capacity for the implementation of energy efficiency strategies.	• Current proposal to open up a Deputy Director post in the DME for Energy Efficiency and the Environment (in directorate of Energy Planning). • Development of a business plan for an Energy Efficiency Agency (LHA Management Consultants)

Table A1: Government policies related to energy efficiency
Source: DME (1998); Du Toit (2000)

Appendix B
Natural evolution of the energy services industry

Primary focus	Stage 1 Conservation Price reform Resource allocation	Stage 2 Programmatic efficiency DSM	Stage 3 Private energy services	Stage 4 Convergent services with energy as the integrating catalyst
Activities	New regulations, codes and standards Setting savings goals and targets 'Command and control' (i.e. active load management) 'Carrot approaches' (i.e. incentives, moral suasion for voluntary actions) 'Shock cushioning' (i.e. providing protection for affected sectors less able to cope with rapid changes)	Use of utilities as implementing agents of change Formal programmes with incentivised measures Formal monitoring and evaluation 'Success' denominated almost exclusively as cost savings or avoided outlays Reliance on paid contracts versus strategic allies/business partners	Project orientation Some variant of performance contracting Success still denoted in financial terms (i.e. paybacks, IRR) Vendors/ manufacturers/ actively enter service/ technology delivery chain.	Value creation rather than cost savings is driving business decision Energy and non-energy services bundled to provide increased comfort, convenience, productivity or competitive advantage Maximum use of strategic alliances to create 'virtual' system integrators IT permeates integrated solution

Appendix C
NLRAs, decoupling and balancing accounts

Cost-of-service or rate-of-return regulation

According to this approach (which is widely adopted in the United States) tariffs are set so that the revenues from retail sales of electricity will cover the full costs of supplying that electricity, including generation, transmission and distribution costs, plus a fair rate of return on investment. New plant costs are not included into the tariffs until commercial operation, when costs are placed into the 'rate base' and become part of the total cost of services to be recovered by the tariff. A crucial step in this process is the determination that costs are 'prudently' incurred and that the projects are 'used and useful'.

The drawback of this method is that it does not provide the regulated utility with any incentive to minimise costs. If a utility is guaranteed revenues sufficient to cover its reasonably regulated costs, and furthermore, it its efforts to reduce the costs result in a commensurate reduction in utility revenue, the a utility has little incentive to reduce costs.

This approach allows utilities to recover DSM programme costs but discourages them from pursuing customer energy-efficiency programmes because:

(i) utilities were not allowed to recover DSM programme expenses when these expenses have not been included in a previous tariff-setting process;

(ii) utilities lost revenues from successful customer energy-efficiency programmes; and

(iii) utilities lost earnings opportunities because resources were devoted to DSM programmes rather than to other profit making activities.

This approach is criticised because in allowing utilities to recover the cost of DSM programmes through tariff increases, it amounted to DSM programmes being funded through a broad tax on all customers, thus benefiting a particular group of customers at the expense of others.

Performance-based regulatory approach

As part of an ongoing debate about competition in the electric utility industry, regulators are increasingly considering performance-based approach as an alternative to traditional rate-of-return regulation. It is hoped that performance-based regulation will enable regulators to:

(i) provide more direct incentives for utilities to lower electricity costs

(ii) reduce the price disparities between high- and low-cost electricity producers, and

(iii) reduce the level of regulatory oversight of the electric utility planning process.

PBR mechanisms can be designed in a variety of different ways – each providing different signals and incentives to utilities. The mechanisms usually fall within two general categories: price caps and revenue targets.

Price caps

With price-cap mechanism, electricity tariffs are set by the regulator at an initial level sufficient for the utility to recover its costs plus a reasonable profit. Over a certain period (e.g. five to six years), the utility would be allowed to increase its prices only to account for inflation, net of some allowance for increased productivity. If the utility can keep its cost increases below the net effect of inflation and productivity, then it can keep the difference as profits. If the utility's costs escalate at a rate greater than inflation net of productivity, then its profits will suffer.

Price caps provide utilities with a powerful incentive to increase electricity sales, because additional units of sales will translate into additional profits, and lost sales will turn into lost profits. Therefore price caps create strong disincentives to DSM and incentives to promote load building. Price cap fixes allowed electricity prices for longer periods of time than generally occurs with traditional tariffmaking.

To partially remove this DSM disincentive, regulators in England and Wales initiated a 'decoupling' of volume sales from profits. According to this approach, the volume-related element of the revenue allowance was reduced by half for both supply price and distribution price cap mechanisms.

Revenue targets

With revenue targets, the regulator begins by setting an allowed level of revenues based on actual costs. Electricity prices are then derived from the allowed revenues and the expected level of sales. Over time, the allowed revenues can be adjusted to account for inflation and productivity, similar to price-cap mechanisms. If revenues deviate significantly from those forecast, the difference will be returned to, or recovered from, ratepayers through periodic adjustments. This reconciliation process differentiates revenue targets from price caps, and ensures that there are no windfall profits and losses due to unanticipated changes in sales. The reconciliation process is usually undertaken by way of a balancing account.

		A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*
		Expected price (R/kWh)	*Expected sales (kWh)*	*Authorised revenue (Rs)*	*Price (R/kWh)*	*Collected sales (kWh)*	*Revenue (Rs)*	*Reported revenue (Rs)*	*+/- (Rs)*	*Balance account (Rs)*
GRC1	Yr 1	0.100	1000	100.00	0.100	1100	110.00	100.00	10.00	(10.00)
	Yr 2	0.100	1000	100.00	0.090	990	89.10	100.00	(10.90)	0.90
GRC2	Yr 3	0.110	1010	111.10	0.111	1010	112.00	111.10	0.90	0.00

Table A2: Basic example of a balancing account
Source: Eto, Stoft & Belden (1997)

Assume that this mechanism operates in a region with a two-years general rate-case cycle and no other between-rate-case revenue adjustments. The basic mechanism requires three sets of numbers to track revenue and price. Columns A-C are established in the general rate case and remain fixed until the next general rate-case. Columns D-F represent what actually occurs during each year. Columns G-I represent the numbers that the utility reports in its income statements

Year 1: General rate case no 1 (GRC1) authorises revenue of R100 based on expected sales of 1 000 kWh. During the year, the utility sells 1100 kWh at R0.10 kWh, resulting in a collected revenue of R110. The mechanism ensures that the utility will only keep the authorised revenue of R100. Thus, – R10 is placed into the balancing account.

Year 2: Authorised revenue of R100 and expected sales of 1 000 kWh are still in effect from GRC1. In addition, the utility must return R10 to ratepayers from the previous year's over-collection. Accordingly, if the utility collects R90 this year, it will even with the ratepayers. So, the Year 2 price of R0.09/kWh is calculated by dividing the total revenue that the utility needs to collect (R90) by expected sales (still 1000kWh). However, in this case, the utility sells less electricity than expected, resulting in a collected revenue of R100, which covers the R89.10 collected from ratepayers this year, the R10 extra that was collected from ratepayers last year, and R0.90 that appears in the balancing account, representing money that the ratepayers will now owe the utility in Year 3

Year 3: As a result of General Rate Case 2, authorised revenue has increased to R110.10 based on the expected sales of 1010 kWh. In addition, the utility is allowed to collect R0.90 from ratepayers because of the previous years' shortfall. Accordingly, it the utility collects R112 this year, it will be even with ratepayers. Thus, the Year 3 price of R0.11/kWh is calculated by dividing the total revenue that the utility wants to collect (R112) by the expected sales (now 1 010 kWh). As it turns out, actual sales match expected sales, resulting in collected revenues of R112. The utility reports revenue of R111.10 for Year 3 and the difference in the balancing account (R0.90) means the utility has recovered the previous year's shortfall.

In the United States, regulators seek to achieve revenue targets through the use of net-lost revenue adjustments (NLRAs). These adjustments (used together with decoupling mechanisms) are intended to remove the disincentives associated with traditional rate-of-return regulation.

Decoupling sales from revenues and profits.
Regulatory tariff structures often link energy sales (kWh) with utility revenues and profits, which is a clear disincentive for the utility to engage in any DSM that reduces sales. As a means of overcoming this disincentive, regulatory authorities can design the rate structure such that the income to the utility is not dependent on sales volume (in kWh) but on some other measure of service (such as growth in number of customers). In other words, instead of letting revenues grow with increasing kWh sales, decoupling allows revenues to grow with other factors that are independent of changes in actual electricity use. Decoupling ensures that actual revenues exactly match an established revenue requirement, regardless of the sales level. Every decoupling mechanism consists of two parts. First, all decoupling mechanisms use balancing accounts to guarantee the exact collection of authorised revenues over time. Second, all decoupling mechanisms work in conjunction with an explicit method for changing the level of authorised revenue during years between general tariff reviews.

Net-lost revenue adjustments
NLRAs are designed to compensate utilities for changes in revenues associated with utility DSM programmes. To implement an NLRA, the utility first estimates the energy and load reductions caused by its DSM programmes for the year in question. These GWh- and MW- savings are then multiplied by the difference between retail price and short-term costs (both energy and capacity) and the two products (lost energy and lost capacity revenues) are added together. This sum is the net lost revenues caused by the utility's DSM programme. It is called 'net' because it is equal to the difference between the reduction in utility revenue minus the reduction in utility cost (fuel and variable O & M costs).[29]

Generally, decoupling is likely to be appropriate for utilities that run (or plan to run) large DSM programmes and for which the difference between retail price and short-term costs is large. Decoupling also makes sense where the regulator only has limited staff resources to monitor the utility's DSM programmes. NLRAs, which are more narrowly focused than decoupling, tend to encourage utilities to operate DSM programmes that look good on paper but fail to produced energy savings in practice (Hirst & Blank 1994). Thus NLRAs are probably best suited for utilities that operate only small programmes, or where the difference between price and short run marginal costs is small. Both of these factors reduce the amount of money flowing through the NLRA and relieve some of the problems associated with evaluation and definition of energy savings (Hirst & Blank 1994).

Decoupling	*Net-lost-revenue adjustments*
Removes incentives to sell more electricity and all DSM disincentives	Removes some DSM disincentives (extra sales caused by load-building programmes benefit shareholders)
Does not require evaluation	Requires sophisticated and precise evaluation methods and results
Utility does not profit from DSM programmes that produce less than expected energy savings	Utility may profit from DSM programmes that save less than expected
Compensates utilities for fixed DSM costs	Compensates utilities for fixed and variable costs
Eliminates utility disincentive to support public policies that increase efficiency (i.e. rate design, efficiency standards and education programmes)	Continues utility disincentives to support public policies that increase energy efficiency

Table A3: Comparison of decoupling and net-lost revenue adjustment mechanisms
Source: Moskovitz, Harrington & Austin (1992)

[29] For a more detailed account of NLRAs see Baxter (1995), Hirst and Blank (1994).

Mechanisms to provide additional DSM incentives

The following mechanisms have been used in the United States to provide utilities with additional incentives to invest in DSM. Note that these incentives have been applied to investor-owned (as opposed to public-owned) utilities. Note also that hybrids of these mechanisms are also sometimes used.[30]

- *Shared-savings mechanisms.* The shared-savings incentive mechanism provides utility shareholders with a share of the energy savings benefits, or 'net benefits'. Shared savings are the most common mechanism used to reward utilities for investing in DSM programmes.
- *Bonus mechanisms.* Bonus mechanisms reward utility shareholders on a per-unit basis for energy and demand savings. They are less common than shared savings.
- *Mark-up mechanisms.* Mark-up mechanisms provide a mark-up on DSM programme expenditures, generally varying from five to ten per cent. Mark-up mechanisms frequently apply to a subset of utility programmes, where energy savings benefits are particularly difficult to measure (i.e. information programmes) or where the programmes undertaken are based on equity rather than efficiency considerations (Eto, Stoft & Kito 1998).

These performance-based reforms mark a distinct motion towards eliminating the bias between the utility's incentive to build power plants and its incentive to invest in efficiency. Despite this, cost-of-services regulation is still used to treat of utility investment in plant and equipment. Cost of services regulation is thus likely to continue to bias utility decisions governing investment capital.

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[30] For a detailed account of these mechanism see Eto, Stoft & Kito (1998); Haaland & York (1994); Weil (1994).

Appendix D
Synthesis of recommendations and barriers addressed

Recommendation	*Barrier addressed*
Recommendations to government	
If government is to be seen to be a credible leader in the area of energy efficiency, then it must fulfil its commitments as detailed in the White Paper on Energy Policy for South Africa (1998)	• Government is currently not seen to be a leader in the area of energy efficiency. • Resource constraints limit the priority list of government.
The proposal to re-introduce a position dedicated towards energy efficiency and environmental issues must be adopted and implemented as soon as possible. Like environmental issues, capacity building and black economic empowerment, energy efficiency should be treated as a cross-cutting issue and should not be associated with just electricity but rather with energy in general.	• The government's organisational structure does not support energy-efficiency investment.
The function of DME's energy efficiency and environmental position is to facilitate the creation of an enabling environment for public benefit energy-efficiency in South Africa, and not to become involved in in-depth implementation activities linked with the energy services industry.	• Government is currently not seen to be a leader in the area of energy efficiency. • Government does not have the current capacity to be involved in implementation on a large-scale.
Government initiate a second (this time, more in-depth) feasibility study of a National Energy Efficiency Agency. This feasibility study should take into account the likely implications power sector restructuring will have on investment in public benefit energy-efficiency programmes.	• Neither government nor the NER has the current capacity to administer, initiate and implement public benefit energy-efficiency programmes. Yet, the need clearly remains for these programmes. • Substantial private sector participation will probably not occur until investment in the energy services industry is seen to be less risky. • Links in the supply chain to deliver energy efficiency are not yet in place. • 'Twice-bitten, thrice shy barriers'.
Government should continue to develop its work on standards and codes for energy efficiency. The DME should initiate/co-ordinate this programme.	
Government and the NER must work together to create an environment that encourages energy-efficiency investments.	• In existence is a light-handed regulatory approach still to require and enforce energy-efficiency investment. • Lack of co-ordination between government and the NER because there is currently no energy efficiency post within the DME. • As competition is introduced into the power sector, tools to support energy-efficiency investment are less easy to develop and employ.
The proposal to establish a full-time post dedicated towards energy efficiency should be adopted on condition that one of the posts main objectives is to ensure that the DME work closely with the NER on energy-efficiency related issues.	• There is a lack of co-ordination and communication between government and the NER in the area of energy efficiency. • This is probably the case because there is currently no energy efficiency post within the DME to ensure that this occurs.
Recommendations to the NER	
The NER must make a decision on whether it will seek to support investment in public benefit energy efficiency. Broadly, thus would entail the creation of a regulatory framework in which supply- and demand- investments are both valued and therefore considered.	• Currently, there is confusion about what position the NER will hold in this regard. This uncertainty may result in a decline in investment in energy efficiency: the distribution industry is not sure whether the NER will support these efforts. • Demand-related investments are not currently not

Recommendation	*Barrier addressed*
	given due consideration.
The NER should play a lead role in the development of a culture that values investment in public benefit energy-efficiency investment. This should be done through close involvement in policy development and advocacy in this area, but through leaving the various supportive, enforcement, monitoring and evaluatory functions, as well as implementation of public benefit programmes, to the National Energy Efficiency Agency.	• Currently, public benefit energy-efficiency programmes are not high on the agenda of the electricity industry. Utilities are generally supply-side oriented and staff are of the opinion that DSM is 'yet to prove itself'. • Neither the NER nor overnment have the capacity to grow the energy services industry to the extent that is necessary.
Through decoupling and other mechanisms, the NER should seek to ensure that utility profits are not linked to revenues and sales.	• There is a danger that utilities allowed revenues will be based on sales.
The NER should develop 'Standards of Performance' which detail the nature and value of the minimum energy-efficiency investments which municipal distributors or REDs would be obliged to take responsibility for. The NER should assess different stipulations of this requirement (for instance, through total annual revenues, distributed energy, customer base etc.).	• If the NER does not require the distribution industry to invest in public benefit energy efficiency, it is unlikely that this investment will be made. This is because distributors' top priority is sales maximisation. • Competing priorities detract from investing in DSM • If a minimal amount of energy efficiency is required by the NER, then it is likely that utilities will seek to implement energy-efficiency programmes which are in their interests to do so and will avoid other programmes. In addition, it is likely that many 'so-called' energy-efficiency investments will be token investments that do not achieve desired results.
The NER should develop in-house capacity to ensure that the minimum energy efficiency requirements meet criteria as detailed in the Standards of Performance or the NER retain the services of the proposed National Energy Efficiency Agency to do so.	• Currently the NER does not have adequate numbers of staff to justify taking on additional support and verification activities.
The NER should undertake a critical assessment of net lost revenue adjustment (NLRA) mechanisms. This assessment should include investigations of the economic, administrative and institutional implications of establishing such a mechanism. The decision whether the NER should establish NLRAs should be linked closely with the decision whether the NER supports the establishment of the public benefits surcharge. Even through the NLRA and the public benefits surcharge would finance different aspects of utilities' energy-efficiency investment, it is recommended that the NER does not do both.	• Currently, there are no incentives for distributor utilities to undertake investment in public benefit energy-efficiency programmes. To do so, utilities must forgo lost revenue, pay for programme costs and implementation costs. • There is currently inadequate information to either recommend or reject the NLRA mechanism.
The NER should not allow utilities to profit from energy-efficiency investments either through mark-up or bonus mechanisms	• The NER does not have the capacity to administer these mechanisms. • These mechanisms can invite regulatory abuse and programmes that look good on paper but do not achieve the desired results.
The NER should undertake a detailed analysis of a potential public benefits surcharge. The analysis should investigate (I) how this public benefits charge should be collected and spent; (ii) what the charge per customer should be in order that adequate funds can be raised; (iii) what this charge should be spent on (energy efficiency, research and development, renewable energy etc.)	• Currently, there are no incentives for distributor utilities to undertake investment in public benefit energy-efficiency programmes. To do so, utilities must forgo lost revenue, pay for programme costs and implementation costs. • There is currently inadequate information to either recommend or reject the NLRA mechanism.
The NER must begin now to test regulatory mechanisms to promote public benefit energy-efficiency programmes.	• South Africa has had no experience in this area. • International experience is useful but must be tried and tested.

Recommendation	*Barrier addressed*
The NER should work closely with the government in the area of energy efficiency	• There is inadequate communication between the NER and the DME in the area of energy efficiency.
Recommendations to Eskom and municipal distributors	
Eskom and municipal distributors should continue to develop capacity to undertake and deliver energy efficiency DSM activities	• South Africa has had relatively little experience in this area. • Even if regulatory and governance mechanisms are put in place to support energy-efficiency investment, there will be no success in this area if the delivery channels are not functioning. • Methodology to evaluate DSM is inconsistent.
In addition to growing its capabilities in DSM implementation, Eskom must also begin to transfer its skills/experiences in this area to other municipal distributors	• As above. • Municipal distributors have generally had less experience in this area than has Eskom. • Smaller municipalities cannot reap 'economies of scale' benefits of DSM. • Highly specialised skills are in short supply.
Eskom and municipal distributors should lobby the NER and Government for environments conducive to investment in energy efficiency	• A comprehensive regulatory framework is currently not yet in place.
The distribution industry should lobby for the establishment of a National Energy Agency	• There are currently no national structures to support national energy-efficiency investment.

Appendix E
Robustness of recommendations

Recommendation	*Comment on robustness/applicability of recommendation*
Recommendations to government	
If government is to be seen to be a credible leader in the area of energy efficiency, then it must fulfil its commitments as detailed in the White Paper on Energy Policy for South Africa (1998)	• Strategy for current implementation • Positions government for the future
The proposal to re-introduce a position dedicated towards energy efficiency and environmental issues must be adopted and implemented as soon as possible. Like environmental issues, capacity building and black economic empowerment, energy efficiency should be treated as a cross-cutting issue and should not be associated with just electricity but rather with energy in general.	• Strategy for current implementation • Positions government for the future
The function of DME's energy efficiency and environmental position is to facilitate the creation of an enabling environment for public benefit energy efficiency in South Africa, and not to become involved in in-depth implementation activities linked with the energy services industry.	• Strategy for current implementation • Positions government strategically
Government initiate a second (this time, more in-depth) feasibility study of a National Energy Efficiency Agency. This feasibility study should take into account the likely implications power sector restructuring will have on investment in public benefit energy-efficiency programmes.	• Strategy for current implementation • The establishment of a public-sector National Energy Efficiency Agency will help to remove capacity constraints within government and the NER, as well as create a natural 'home' for energy efficiency as the power sector is restructured. Without an independent Agency to support this process, it is unlikely that any significant investment will be made.
Government should continue and develop its work on standards and codes for energy efficiency. The DME should initiate/co-ordinate this programme.	• Strategy for current implementation, in preparation for future positioning • Standards and codes are important now, but will become increasingly important as more competition is introduced into the power sector. This is because fewer regulatory tools will be at hand to protect energy-efficiency investment.
Government and the NER must work together to create an environment that encourages energy-efficiency investments.	• As more competition is introduced, energy-efficiency investment will likely decline. Thus, it will become increasingly important for government and the NER to collaborate in this area to create an integrated framework.
The proposal to establish a full-time post dedicated towards energy efficiency should be adopted on the condition that one of the post's main objectives is to ensure that the DME work closely with the NER on energy-efficiency related issues.	• As above
Recommendations to the NER	
The NER must make a decision on whether it will seek to support investment in public benefit energy efficiency. Broadly, thus would entail the creation of a regulatory framework in which supply- and demand- investments are both valued and therefore considered.	• For action in the short-term. The electricity industry is soon to undergo considerable change. Industry players are demanding more decisiveness and clarity from the NER. • Making a decision on this will assist the NER in developing an overall longer-term strategy.
The NER should play a lead role in the development of	• As competition is introduced into the electricity

Recommendation	*Comment on robustness/applicability of recommendation*
a culture that values investment in public benefit energy-efficiency investment. This should be done through close involvement in policy development and advocacy in this area, but through leaving the various supportive, enforcement, monitoring and evaluatory functions, as well as implementation of public benefit programmes, to the National Energy Efficiency Agency.	industry, investment in energy efficiency is likely to decline. It becomes increasingly difficult to provide incentives to ensure such investment. A culture in which energy efficiency is deemed to be worthwhile could have more sustainable and ongoing positive impact than any regulatory or legislative tool.
Through decoupling and other mechanisms, the NER should seek to ensure that utility profits are not linked to revenues and sales.	• Decoupling mechanisms begin to lose impetus when competition is introduced into the retail industry (i.e. when retail and distribution businesses are de-linked and retail is deregulated. Often it is easier for Regulators to implement a DSM surcharge, or minimal DSM investment obligations to overcome the disincentives to invest in energy efficiency.
The NER should develop Standards of Performance which detail the nature and value of the minimum energy-efficiency investments which municipal distributors or REDs would be obliged to take responsibility for. The NER should assess different stipulations of this requirement (for instance, through total annual revenues, distributed energy, customer base etc.).	• This strategy is robust in all electricity contexts i.e. when competition for electricity services is offered at both wholesale and retail levels
The NER should develop in-house capacity to ensure that the minimum energy efficiency requirements meet criteria as detailed in the Standards of Performance or the NER retain the services of the proposed National Energy Efficiency Agency to do so.	• Positioning NER for the future when competition is introduced into the power sector. • Developing capacity to 'understand' energy-efficiency programmes undertaken by the distribution industry.
The NER should undertake a critical assessment of net lost revenue adjustment (NLRA) mechanisms. This assessment should include investgations of the economic, administrative and institutional implications of establishing such a mechanism. The decision whether the NER should establish NLRAs should be linked closely with the decision whether the NER supports the establishment of the public benefits surcharge. Even through the NLRA and the public benefits surcharge would finance different aspects of utilities' energy-efficiency investment, it is recommended that the NER does not do both.	• NLRA mechanisms would be useful in current contexts but less useful when competition is introduced into the retail industry. NLRA mechanisms could be employed now, but should be supported by other regulatory requirements/incentives in the longer term.
The NER should not allow utilities to profit from energy-efficiency investments either through mark-up or bonus mechanisms.	• Allowing utilities to profit from energy efficiency could result in excessive DSM investments that look good on paper and do no more. • The NER does not have the capacity now to administer these mechanisms.
The NER should undertake a detailed analysis of a potential public benefits surcharge. The analysis should investigate (I) how this public benefits charge should be collected and spent; (ii) what the charge per customer should be in order that adequate funds can be raised; (iii) what this charge should be spent on (energy efficiency, research and development, renewable energy etc.)	• Effective way of collecting funding for energy-efficiency investment • Useful in most power sector contexts • Short-term strategy will be to learn about this surcharge, while the long-term strategy will be to implement it.
The NER must begin now to test regulatory mechanisms to promote public benefit energy-efficiency programmes.	• Positioning for the future.
The NER should work closely with the government in the area of energy efficiency	• As more competition is introduced, the NER will have fewer mechanisms at hand to encourage energy-efficiency investment.

Recommendation	*Comment on robustness/applicability of recommendation*
	Collaboration with government will be important if an integrated public sector strategy is to be developed.
Recommendations to Eskom and municipal distributors	
Eskom and municipal distributors should continue to develop capacity to undertake and deliver energy efficiency DSM activities	• Positioning now for longer-term benefit by distribution industry. This will be especially important if the NER requires a minimum amount of energy-efficiency investment.
In addition to growing its capabilities in DSM implementation, Eskom must also begin to transfer its skills/experiences in this area to other municipal distributors	• As above.
Eskom and municipal distributors should lobby the NER and Government for environments conducive to investment in energy efficiency	• As above.
The distribution industry should lobby for the establishment of a National Energy Agency	• As above.

Appendix F
Presentation: Preliminary recommendations to government

1

Electricity industry restructuring and implications for investments in DSM

- International review
- Barriers inhibiting investment in DSM in South Africa
- ESI scenarios and implications for DSM
- Recommendations to government, NER and Eskom
- Funding options for DSM
- Synthesis

Energy & Development Research Centre DSM and ESI restructuring

2

Industry-wide recommendations on positioning DSM in new electricity industry contexts

- Recommendations to government (creating enabling environment, areas of priority, institutional framework)
- Recommendations to NER (regulatory regime, and regulatory mechanisms)
- Recommendations to Eskom and distributors (reducing utility barriers)

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3

Lessons from international experience

- The **public sector's** role in encouraging optimal investment in energy efficiency is critical
- "Rules of the game" should be established **prior** to restructuring and should apply "right from the start"
- It is not clear whether utilities should continue to administer DSM programmes
- **Secured** funding and **independence** are critical success factors for public agencies/programmes dedicated towards promoting energy efficiency
- IRP not enough

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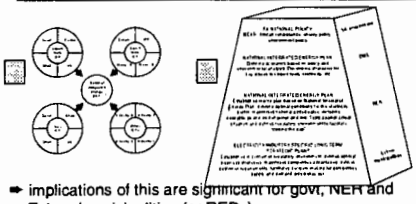
4

"Top-down" planning approach versus a "bottom-up" approach



- implications of this are significant for govt, NER and Eskom/municipalities (or REDs)

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5

Barriers inhibiting investment in energy efficiency - government level

- The organisational structure of the DME does not support energy efficiency
- Resource constraints limit the priority list of DME and the Government
- DME's past experience with public agencies has not been entirely happy (twice-bitten, thrice-shy)
- Light-handed regulatory approach is still to require require DSM performance

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6

Preliminary recommendations to DME

- **Giving energy efficiency 'serious' attention as recommended by South Africa's White Paper on Energy Policy**
  - This is important if the Government is to been seen to be a *credible* leader in the energy efficiency arena.
  - Given limited resouces, Government must create an "enabling environment" that attracts private sector investment and involvement in the area.

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7

Preliminary recommendations to the DME

- **Establishing 'serious' DME capacity to give strategic direction to energy efficiency priorities, co-ordinate governmental activities, monitor & evaluate initiatives, as well as develop and enforce DME's policy positions**
  - A champion or office for energy efficiency is vital, if energy efficiency is to earnestly remain on Government's agenda

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Preliminary recommendations to the DME

- **Supporting the IEP consultancy project and ensuring that skills are transferred to the DME**
  - The DME should take care to ensure that (i) the current IEP consultancy project is integrated into the DME's planning processes, and that (ii) once the consulting team has completed its tasks, there are adequate skills and know-how within the DME to continue (and grow) the process.

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9

Preliminary recommendations to DME

- **Giving NER directive and committing support (resources and other) to implement policies in White Paper on Energy Policy**
  - International experience demonstrates that regulatory tools are probably the most powerful public sector means of promoting energy-efficiency investment
  - Government and the NER play complementary roles in promoting energy efficency and **must** work closely together in this area.

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Preliminary recommendations to the DME

- **Developing and enforcing codes and standards**
  - Complementary to regulatory efforts to ensure investment in (public benefit) energy efficiency investment, Government must continue work (e.g. "SAEDES" and "Minimum Norms and Standards for Low-Cost Housing") on codes and standards
  - These are important tools, and will become even more so as more competition is introduced into the power sector

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Preliminary recommendations to the DME

- **Establishing a National Energy Efficiency Agency**
  - The NEEA should focus on protecting **public-benefit** energy efficiency investments (like training, education and awareness programmes, demonstrations etc.).
  - Its focus should also be on policy implementation, and wide-scale industry co-ordination activities.
  - The NEEA should be given independent status and utility/private sector bias should be avoided.
  - The NEEA should support relevant regulatory activities
  - Given government resource constraints, international and/or private sector funding should be secured

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Key decisions for DME

- **Is energy efficiency a real priority of the South African Government?**
- **Can the South African government afford to support energy efficiency?**

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Key decisions for DME

- Should DME create an office/position for energy efficiency?
- Should DME initiate the establishment of a National Energy Efficiency Agency to support DME and NER efforts?
- What mechanisms can be employed to ensure effective and efficient communication between the NER and Government? (thus enhancing complementarity between codes/standards, regulatory requirements)

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Key decisions for DME

- What can be done now to ensure that IEP skills remain within the DME?
- Given limited resources, which energy efficiency programmes should be prioritised?

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Recommendations to NER

Why should the NER support energy efficiency when the price of electricity is low, where there is current excess capacity, and where good energy efficiency programmes can succeed in delaying the market entrance of new IPPs, and proposed ESI industry restructuring initiatives?

... because the NER represents the end-user, and it has been proven that energy efficiency reduces the **social** costs associated with producing, delivering and consuming electricity.

... because the whole point of restructuring is to introduce a greater degree of economic efficiency into the industry anyway

... because this is not about either-ors but rather about achieving a balance and about good timing (market transformation issues too).

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Three issues for NER to consider

- The big DSM investment 'gap' lies in the area of energy efficiency (as opposed to other load management initiatives)
- It is important to distinguish between different electricity contexts (especially without/with competition in the retail side of the distribution industry) because it is likely that different regulatory tools will be needed to support energy efficiency in these contexts
- Regulatory mechanisms are probably the most powerful of all tools in promoting energy efficiency investment (i.e. approach adopted by the NER will shape the future of energy efficiency investment in South Africa)

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IRP requirements versus DSM requirements

- By requiring that generation, transmission and distribution base investment decisions on principles of IRP does **not** necessarily mean that energy efficiency will be invested in (if there is a loop-hole, it will be found)
- The implication of this is that if the government and the NER are serious about energy efficiency it will probably be necessary to ensure that **in addition** to IRP requirements, the NER makes a 'minimal' amount of DSM investment requisite of either a license or a particular level of profits.

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Regulatory regimes of the future

- Currently the NER bases its decisions on a combination of benchmarking exercises, rate-of-return and performance-based regulation.
- In new electricity contexts, it is likely that NER decisions will be more clearly linked to a performance-based regulatory regime (though until retail competition is introduced into the distribution industry it is likely that some benchmarking will continue to occur).
- This all represents good news for DSM and energy efficiency as long as supply-side investments are NOT concurrently subject to rate-of-return regulation.

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Traditional rate-of-return regulation offers bleak prospects for energy efficiency DSM

- While from a financial perspective this approach may often appear to be the best option, it frequently yields decisions which are at odds with a socially efficient, least-cost planning outcome (i.e. maximising NRB).
- In its purest sense, this approach does not bode well for energy efficiency investment
  - It encourages generators to build new capacity and distributors to sell more electricity.
  - It usually allows for the recovery of DSM programme costs but doesn't allow for the recovery of lost revenue and lost earnings opportunities)

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Traditional performance-based regulation is still not enough...

- To regulate the monopoly elements of the electricity industry, regulators often use a performance-based price cap formula (e.g. CPI - X where "CPI" is the level of inflation and "X" is an incentive factor which regulated utilities must recover by increasing efficiency or lowering costs).
- Like rate-of-return regulation, this approach generally incentivises distributors to maximise sales (reducing fixed costs etc)
- This approach also disincentivises energy efficiency investment (energy efficiency programmes generally result in a high loss of margin)

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Performance-based regulation with "additions" offer hope for energy efficiency (i)

Instead of allowing profits to rise with sales, regulators can:

- *partially or fully decouple sales from profits* (i.e. the volume-related element of the revenue allowed through the price cap can be minimally or significantly reduced). Decoupling allows revenues to growth with other factors that are independent of changes in actual electricity use. It also ensures that actual revenues exactly match an established revenue requirement, regardless of sales level (through balancing accounts).

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Performance-based regulation with "additions" offer hope for energy efficiency (ii)

Instead of allowing profits to rise with sales, regulators can also:

- *compensate utilities for changes in revenues associated with energy efficiency programmes.* This can be done through "net lost revenue adjustment" mechanisms (which usually take account of lost energy and lost capacity revenues)

Decoupling - large DSM programmes, regulator has limited staff, big diffs between retail price and short-term costs
NLRAs - small programmes, small diffs between retail price and short term costs

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Performance-based regulation with "additions" offer hope for energy efficiency (iii)

- To support mechanisms (i) or (ii), regulators publish standards of performance to stipulate what level of energy savings distributor utilities should achieve (e.g. 0.5% of distributed energy).
- These standards are seen to be important because even though mechanisms (i) and (ii) may be in place, distributors generally tend not to take up the opportunity if they do not have to.
- Initially, synergy with benchmarking exercises
- To be of any consequence, these standards need to be supported and enforced (an important function of a NEEA, or a role of the NER, or a balance of the two)

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Light-handed regulatory approach

- An alternative to rate-of-return regulation or to performance-based regulation is a light-handed regulatory approach. This approach should probably then apply to all aspects of the electricity industry (otherwise energy efficiency will suffer)
- According to this approach the NER or government may require, through legislation or minimal regulation distributors to undertake a minimal amount of DSM investment (i.e subject distributors to standards of performance, and compensation maybe)
- NER should expect that only a minimal amount of investment will occur.

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Funding options for DSM

- Either, the NER can allow for the full or partial recovery of costs associated with DSM. It could do this through:
  - offering net lost revenue adjustment mechanisms
  - decoupling sales from revenues
  - introducing a system-wide 'wires-charge' (kWhs)
  - introducing a distribution charge (fixed per customer)
  - applying for a general purpose tax
- Or, the NER can allow distributors to profit 'slightly' from these energy efficiency investments. In addition to the above:
  - shared savings schemes
  - mark-up mechanisms
  - bonus mechanisms
  - others....

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Enforcing DSM requirements...?

- Depends on regulatory regime (heavy- or light-handed?)
- Squeezing profits (potentially adding an additional disincentive to undertake energy efficiency investment)
  - increasing the efficiency factor (X) or adding a new one (E) (i.e. CPI-X-E)
  - reducing allowed profitv (broader approach)
- Threatening withdrawal of licence
  - probably unrealistic
- Retaining services of proposed NEEA, or establishing in-house capacity

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Links with government initiatives

- Establishment (or not) of a NEEA will have significant implications for the NER
  - ⇨ NEEA could take strain off NER and government in terms of dedicating resources towards giving integrated and strategic direction in this area, providing NER with a mechanism to verify energy efficiency requirements, and support distributors undertaking mandatory energy efficiency programmes, identifying the gaps etc.
  - ⇨ If NEEA is not established, and NER requires some energy efficiency investment, it will have to find another way of enforcing/supporting the initiative...

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Summary of energy efficiency options

- **Now**
  - ⇨ Eskom is asking NER for support for a large energy efficiency programme (adjustment in tariff to recover lost revenues associated with ELI, to make initiative revenue nuetral in short term). This may be a good opportunity to investigate future regulatory mechanisms and funding options...(pilot approach?)
  - ⇨ Other distributors are not seriously investing in energy efficiency
  - ⇨ If NER chooses to support this energy efficiency investment, playing field should be level for all (i.e. anyone can participate)
  - ⇨ Given financial status of some municipalities it is unclear that any stipulations should be currently, though an enabling environment must begin to be established

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Summary of options

- **Rationalisation of REDs**
  - ⇨ appropriate opportunity to introduce minimum energy efficiency requirements (tried and tested!)
  - ⇨ full spectrum of regulatory mechanisms and funding options available (two types of retrospective tariff adjustments as well as various system-wide charges)
  - ⇨ benchmarking exercises to simulate competition in distribution, value-added energy efficiency product may contribute towards good customer service
  - ⇨ option to establish NEEA
- **Wholesale competition**
  - ⇨ consolidation of above, though 'threat' looms...

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Summary of options

- **Retail competition**
  - ⇨ Spectrum of regulatory mechanisms narrows significantly because retail business in distribution industry is no longer regulated but is where energy efficiency investments tend to be initiated
  - ⇨ Non-bypassable systems benefit charge is the most obvious option. Proceeds collected by utilities and forwarded to NER for redistribution either to be adminstered by utilities or an independent organisation
  - ⇨ This is where benefits of a NEEA can be fully appreciated (but establish before this time...)

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Key decisions for the NER

1. Nature of regulatory regime?
2. Require minimal energy efficiency investment in addition to IRP obligations?
3. How to enforce this?
4. Allow utilities to recover costs associated with DSM?
5. Allow utilities to profit from energy efficiency programmes?
6. How to link in with government initiatives and directives?

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Appendix G
Presentation: Preliminary recommendations to NER

1

Electricity industry restructuring and implications for investments in DSM

- International review
- Barriers inhibiting investment in DSM in South Africa
- ESI scenarios and implications for DSM
- Recommendations to government, NER and Eskom
- Funding options for DSM
- Synthesis

Energy & Development Research Centre DSM and ESI restructuring

2

Industry-wide recommendations on positioning DSM in new electricity industry contexts

- Recommendations to government (creating enabling environment, areas of priority, institutional framework)
- Recommendations to NER (regulatory regime, and regulatory mechanisms)
- Recommendations to Eskom (and municipalities) (reducing barriers)

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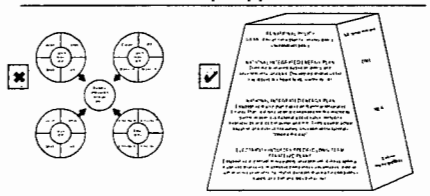
3

"Top-down" planning approach versus a "bottom-up" approach



- implications of this are significant for govt, NER and Eskom/municipalities (or REDs)

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4

Recommendations to government

- Giving energy efficiency 'serious' attention as recommended by White Paper (i.e. creating an "enabling environment" for national energy efficiency investment)
- Giving NER directive and committing support (resources and other) to implement policies in White Paper
- Establishing 'serious' DME capacity to give strategic direction to energy efficiency priority, monitor & evaluate initiatives, as well as enforce policy position
- Establishing a **National Energy Efficiency Agency** (NEEA) (agency could also look at water efficiency)

Energy & Development Research Centre DSM and ESI restructuring

5

Recommendations to NER

Why should the NER support energy efficiency when the price of electricity is low, where there is current excess capacity, and where good energy efficiency programmes can succeed in delaying the market entrance of new IPPs, and proposed ESI industry restructuring initiatives?

... because the NER represents the end-user, and it has been proven that energy efficiency reduces the **social** costs associated with producing, delivering and consuming electricity.

... because the whole point of restructuring is to introduce a greater degree of economic efficiency into the industry anyway

... because this is not about either-ors but rather about achieving a balance and about good timing (market transformation issues too).

Energy & Development Research Centre DSM and ESI restructuring

6

Three issues for NER to consider

- The big DSM investment 'gap' lies in the area of energy efficiency (as opposed to other load management initiatives)
- It is important to distinguish between different electricity contexts (especially without/with competition in the retail side of the distribution industry) because it is likely that different regulatory tools will be needed to support energy efficiency in these contexts
- Regulatory mechanisms are probably the most powerful of all tools in promoting energy efficiency investment (i.e. approach adopted by the NER will shape the future of energy efficiency investment in South Africa)

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7

IRP requirements versus DSM requirements

- By requiring that generation, transmission and distribution base investment decisions on principles of IRP does **not** necessarily mean that energy efficiency will be invested in (if there is a loop-hole, it will be found)
- The implication of this is that if the government and the NER are serious about energy efficiency it will probably be necessary to ensure that **in addition** to IRP requirements, the NER makes a 'minimal' amount of DSM investment requisite of either a license or a particular level of profits.
- It may even transpire that the IRP requirements are too difficult to achieve and that minimal DSM becomes a second-best alternative.

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8

Regulatory regimes of the future

- Currently the NER bases its decisions on a combination of benchmarking exercises, rate-of-return and performance-based regulation.
- In new electricity contexts, it is likely that NER decisions will be more clearly linked to a performance-based regulatory regime (though until retail competition is introduced into the distribution industry it is likely that some benchmarking will continue to occur).
- This all represents good news for DSM and energy efficiency as long as supply-side investments are NOT concurrently subject to rate-of-return regulation.

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Traditional rate-of-return regulation offers bleak prospects for energy efficiency DSM

- While from a financial perspective this approach may often appear to be the best option, it frequently yields decisions which are at odds with a socially efficient, least-cost planning outcome (i.e. maximising NRB).
- In its purest sense, this approach does not bode well for energy efficiency investment
  - It encourages generators to build new capacity and distributors to sell more electricity.
  - It usually allows for the recovery of DSM programme costs but doesn't allow for the recovery of lost revenue and lost earnings opportunities)

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Traditional performance-based regulation is still not enough...

- To regulate the monopoly elements of the electricity industry, regulators often use a performance-based price cap formula (e.g. CPI - X where "CPI" is the level of inflation and "X" is an incentive factor which regulated utilities must recover by increasing efficiency or lowering costs).
- Like rate-of-return regulation, this approach generally incentivises distributors to maximise sales (reducing fixed costs etc)
- This approach also disincentivises energy efficiency investment (energy efficiency programmes generally result in a high loss of margin)

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Performance-based regulation with "additions" offer hope for energy efficiency (i)

Instead of allowing profits to rise with sales, regulators can:

- *partially or fully decouple sales from profits* (i.e. the volume-related element of the revenue allowed through the price cap can be minimally or significantly reduced). Decoupling allows revenues to growth with other factors that are independent of changes in actual electricity use. It also ensures that actual revenues exactly match an established revenue requirement, regardless of sales level (through balancing accounts).

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Performance-based regulation with "additions" offer hope for energy efficiency (ii)

Instead of allowing profits to rise with sales, regulators can also:

- *compensate utilities for changes in revenues associated with energy efficiency programmes.* This can be done through "net lost revenue adjustment" mechanisms (which usually take account of lost energy and lost capacity revenues)

Decoupling - large DSM programmes, regulator has limited staff, big diffs between retail price and short-term costs
NLRAs - small programmes, small diffs between retail price and short term costs

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Performance-based regulation with "additions" offer hope for energy efficiency (iii)

- To support mechanisms (i) or (ii), regulators publish standards of performance to stipulate what level of energy savings distributor utilities should achieve (e.g. 0.5% of distributed energy).
- These standards are seen to be important because even though mechanisms (i) and (ii) may be in place, distributors generally tend not to take up the opportunity if they do not have to.
- Initially, synergy with benchmarking exercises
- To be of any consequence, these standards need to be supported and enforced (an important function of a NEEA, or a role of the NER, or a balance of the two)

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Light-handed regulatory approach

- An alternative to rate-of-return regulation or to performance-based regulation is a light-handed regulatory approach. This approach should probably then apply to all aspects of the electricity industry (otherwise energy efficiency will suffer)
- According to this approach the NER or government may require, through legislation or minimal regulation distributors to undertake a minimal amount of DSM investment (i.e subject distributors to standards of performance, and compensation maybe)
- NER should expect that only a minimal amount of investment will occur.

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Funding options for DSM

- Either, the NER can allow for the full or partial recovery of costs associated with DSM. It could do this through:
  - offering net lost revenue adjustment mechanisms
  - decoupling sales from revenues
  - introducing a system-wide 'wires-charge' (kWhs)
  - introducing a distribution charge (fixed per customer)
  - applying for a general purpose tax
- Or, the NER can allow distributors to profit 'slightly' from these energy efficiency investments. In addition to the above:
  - shared savings schemes
  - mark-up mechanisms
  - bonus mechanisms
  - others....

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Enforcing DSM requirements...?

- Depends on regulatory regime (heavy- or light-handed?)
- Squeezing profits (potentially adding an additional disincentive to undertake energy efficiency investment)
  - increasing the efficiency factor (X) or adding a new one (E) (i.e. CPI-X-E)
  - reducing allowed profitv (broader approach)
- Threatening withdrawal of licence
  - probably unrealistic
- Retaining services of proposed NEEA, or establishing in-house capacity

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Links with government initiatives

- Establishment (or not) of a NEEA will have significant implications for the NER
  - ⇨ NEEA could take strain off NER and government in terms of dedicating resources towards giving integrated and strategic direction in this area, providing NER with a mechanism to verify energy efficiency requirements, and support distributors undertaking mandatory energy efficiency programmes, identifying the gaps etc.
  - ⇨ If NEEA is not established, and NER requires some energy efficiency investment, it will have to find another way of enforcing/supporting the initiative...

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Summary of energy efficiency options

- Now
  - ⇨ Eskom is asking NER for support for a large energy efficiency programme (adjustment in tariff to recover lost revenues associated with ELI, to make initiative revenue nuetral in short term). This may be a good opportunity to investigate future regulatory mechanisms and funding options...(pilot approach?)
  - ⇨ Other distributors are not seriously investing in energy efficiency
  - ⇨ If NER chooses to support this energy efficiency investment, playing field should be level for all (i.e. anyone can participate)
  - ⇨ Given financial status of some municipalities it is unclear that any stipulations should be currently, though an enabling environment must begin to be established

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Summary of options

- **Rationalisation of REDs**
  - ⇨ appropriate opportunity to introduce minimum energy efficiency requirements (tried and tested!)
  - ⇨ full spectrum of regulatory mechanisms and funding options available (two types of retrospective tariff adjustments as well as various system-wide charges)
  - ⇨ benchmarking exercises to simulate competition in distribution, value-added energy efficiency product may contribute towards good customer service
  - ⇨ option to establish NEEA
- **Wholesale competition**
  - ⇨ consolidation of above, though 'threat' looms...

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Summary of options

- **Retail competition**
  - ⇨ Spectrum of regulatory mechanisms narrows significantly because retail business in distribution industry is no longer regulated but is where energy efficiency investments tend to be initiated
  - ⇨ Non-bypassable systems benefit charge is the most obvious option. Proceeds collected by utilities and forwarded to NER for redistribution either to be adminstered by utilities or an independent organisation
  - ⇨ This is where benefits of a NEEA can be fully appreciated (but establish before this time...)

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Key decisions for the NER

1. Nature of regulatory regime?
2. Require minimal energy efficiency investment in addition to IRP obligations?
3. How to enforce this?
4. Allow utilities to recover costs associated with DSM?
5. Allow utilities to profit from energy efficiency programmes?
6. How to link in with government initiatives and directives?

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Appendix H
Presentation: International review and lessons for South Africa

1

Making provision for energy efficiency investment in changing electricity markets: International perspectives

Alix Clark
Energy and Development Research Centre

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Presentation outline

- DSM/ESI research project
- Importance of focused research and recommendations
- Energy industry dynamics
- Overview of impact of power sector reform on public-benefit energy efficiency investment
- Rationale for efforts to invest in public-benefit energy efficiency programmes
- Overview of international efforts to protect public-benefit energy efficiency investment
- Lessons for South Africa and other countries

3

The DSM & ESI restructuring research project

- International review
- Barriers inhibiting investment in DSM in South Africa
- Possible impacts of restructuring the electricity supply industry on DSM
- Possible mechanisms and strategies to position DSM well in a restructured electricity industry
- Funding options for DSM in a restructured electricity industry
- Stakeholder information dissemination and discussion

4

The DSM & ESI restructuring research project (II)

In most other parts of the world, power sector restructuring has resulted in significant declines in investment in DSM

- As the South African ESI restructures, what will happen to DSM here?
- How can we seek to protect DSM investments that yield significant national benefits but are threatened by pending restructuring processes?

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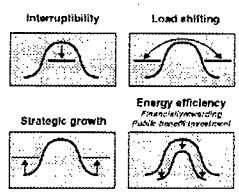
The more focused the research, debates and recommendations, the better!

The international review indicates that DSM investments fall into two broad categories:

- those which are in utilities financial interests to undertake (load shifting, interruptibility, strategic growth and some energy efficiency programmes)
- those which are NOT in utilities financial interests to undertake (public-benefit energy efficiency programmes)



Different approaches apply!

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Electricity industries in flux...

In developing an understanding of how to ensure adequate future energy efficiency investment, the international review has highlighted the importance of taking into account:

- different electricity industry restructuring models

AND...

- different developmental stages of energy services industries.

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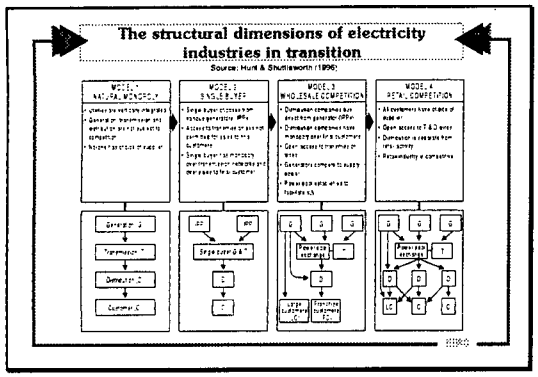

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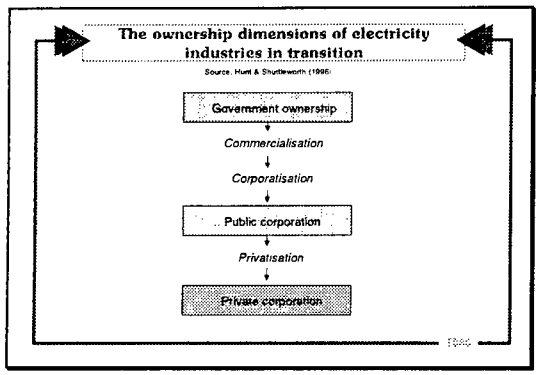

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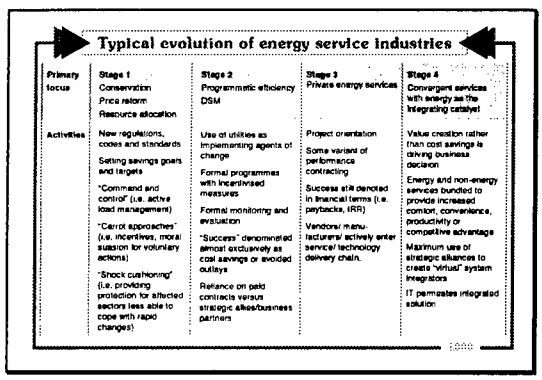

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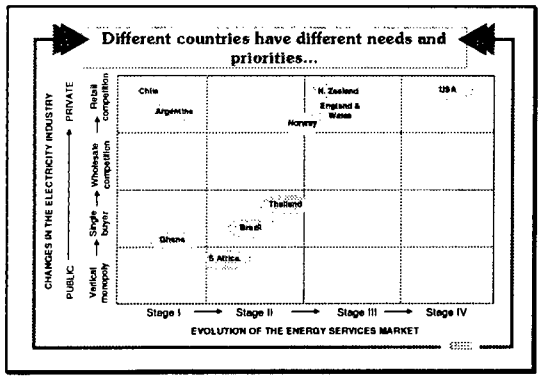

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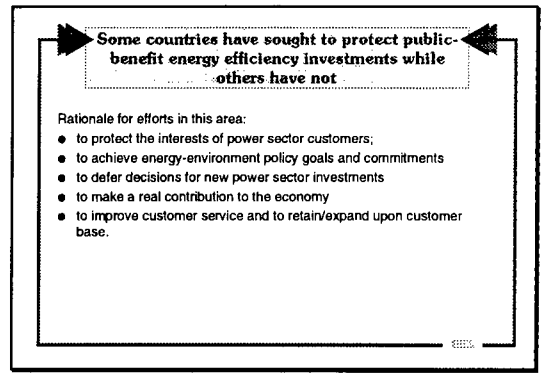

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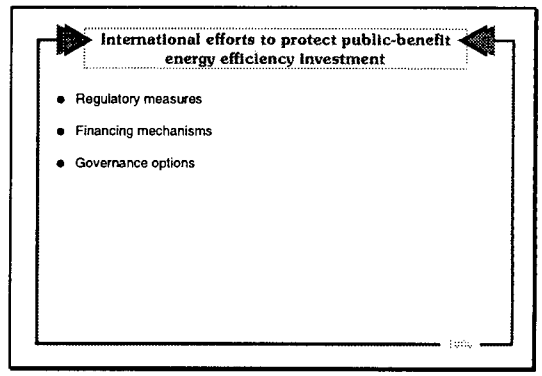

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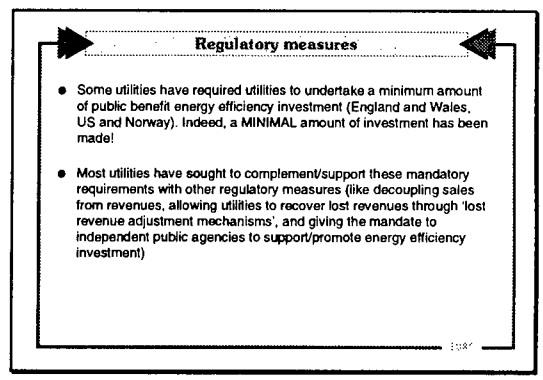

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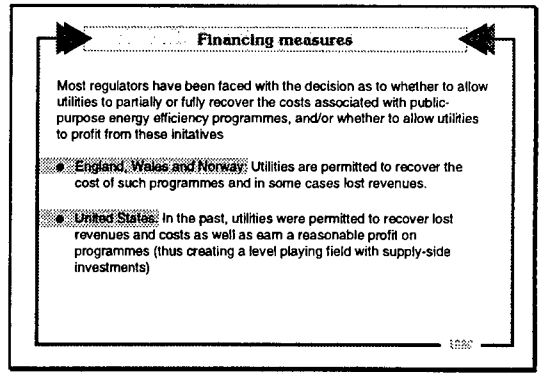

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Financing measures (2)

To enable utilities to recover costs and lost revenues, utilities have adopted various financing mechanisms:

- United States:
  - Until recently, utilities were allowed to recover lost revenues through lost revenue adjustment mechanisms or through decoupling mechanisms.
  - More recently, non by-passable system-wide benefits surcharges (based either on usage, demand or a combination of the two)
  - Shared-savings, bonus and mark-up mechanisms are used to calculate utilities' allowed profits

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Financing measures (3)

To enable utilities to recover costs and lost revenues, utilities have adopted various financing mechanisms:

- England and Wales: Offer introduced a special revenue allowance to be used by RECs to achieve energy savings on behalf of customers (1 pound over 4 years)
- Norway: Energy efficiency investment is funded by a DSM wires or distribution charge (0.0002 NOK/kWh)
- New Zealand: Energy efficiency investment is funded from the central government budget.

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Governance options

In many countries, governments or power sector regulators have chosen to establish **independent agencies to champion** energy efficiency. The mandate and outreach of these independent energy efficiency agencies varies

- New Zealand: Utilities are not obliged to invest in energy efficiency. Rather, the Energy Efficiency and Conservation Authority is responsible for designing and implementing energy efficiency and conservation strategies and programmes.EECA is funded by government
- England and Wales: Offer has retained the Energy Savings Trust to assist RECs in designing and implementing energy efficiency programmes. EST negotiates with Offer and RECs to set each companies energy savings targets, evaluates projects and manages national projects. EST is funded by government

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Governance options

In many countries, governments or power sector regulators have chosen to establish **independent agencies to champion** energy efficiency. The mandate/outreach of these agencies varies:

- Norway: REECs have been established by NVE to undertake energy efficiency programmes on distributors behalf. REECs are funded through the wires charge.
- Ghana: Established by the government and the Private Enterprise Foundation, the Energy Foundation seeks to promote sustainable development through customer education, policy advocacy, strengthening private sector participation and undertaking R&D
- Brazil: PROCEL was established by government(?) and is mandated to carry out R&D, demonstrations, education and training, development of legislation, market transformation, design and implementation of energy efficiency investments.

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Achieving a balance seems important...

- Indications are beginning to emerge that if 'reasonable' levels of energy efficiency are to be invested in, then it is most likely that regulatory provisions, financing mechanisms and independent support are all necessary.
- Countries where these three functions have not all existed are beginning to make provision for them (examples: New Zealand and United States).

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Results of these efforts are varied...

	Utility interest	ESCO activity	Government programmes	Emerging business
Argentina	⇩	⇔	⇔	Load management
Chile	⇩	⇔	⇔	Limited
England/ Wales	⇔	⇔	⇩	Utility ESCOs
Ghana	⇔	⇔	⇧	?
New Zealand	⇔	⇔	⇩	Limited
Norway	⇩	⇩	⇩	Limited
South Africa	⇩	⇔	⇔	Utility ESCO?
Thailand	⇧	⇔	⇧	Utility ESCO
United States	⇩	⇧	⇔	Utility ESCOs

Does this have something to do with different dimensions of change?

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Lessons for SA and elsewhere

- The public sector's role in encouraging public-benefit energy efficiency investment is essential
- Rules of the game should be established prior to restructuring and should be right from the start
- It is not clear whether utilities should continue to administer public benefit energy efficiency programmes
- Secured funding and independence are critical success factors for agencies/programmes dedicated to promoting public benefit energy efficiency investment
- While playing important roles in energy service industries, private sector ESCO programmes are not able to replace traditional utility programmes.

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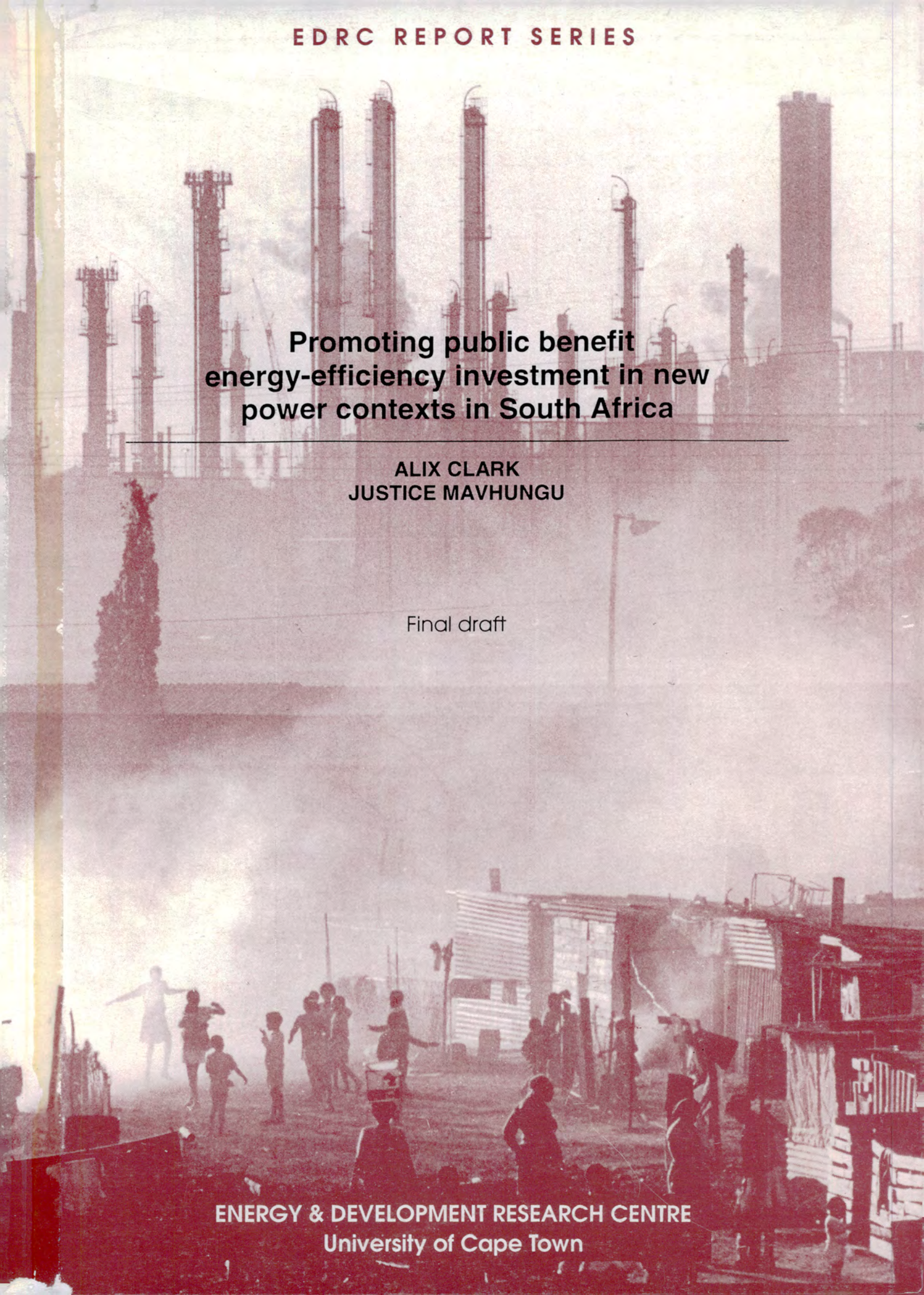

Promoting public benefit energy-efficiency investment in new power contexts in South Africa

ALIX CLARK
JUSTICE MAVHUNGU

Final draft

ENERGY & DEVELOPMENT RESEARCH CENTRE
University of Cape Town